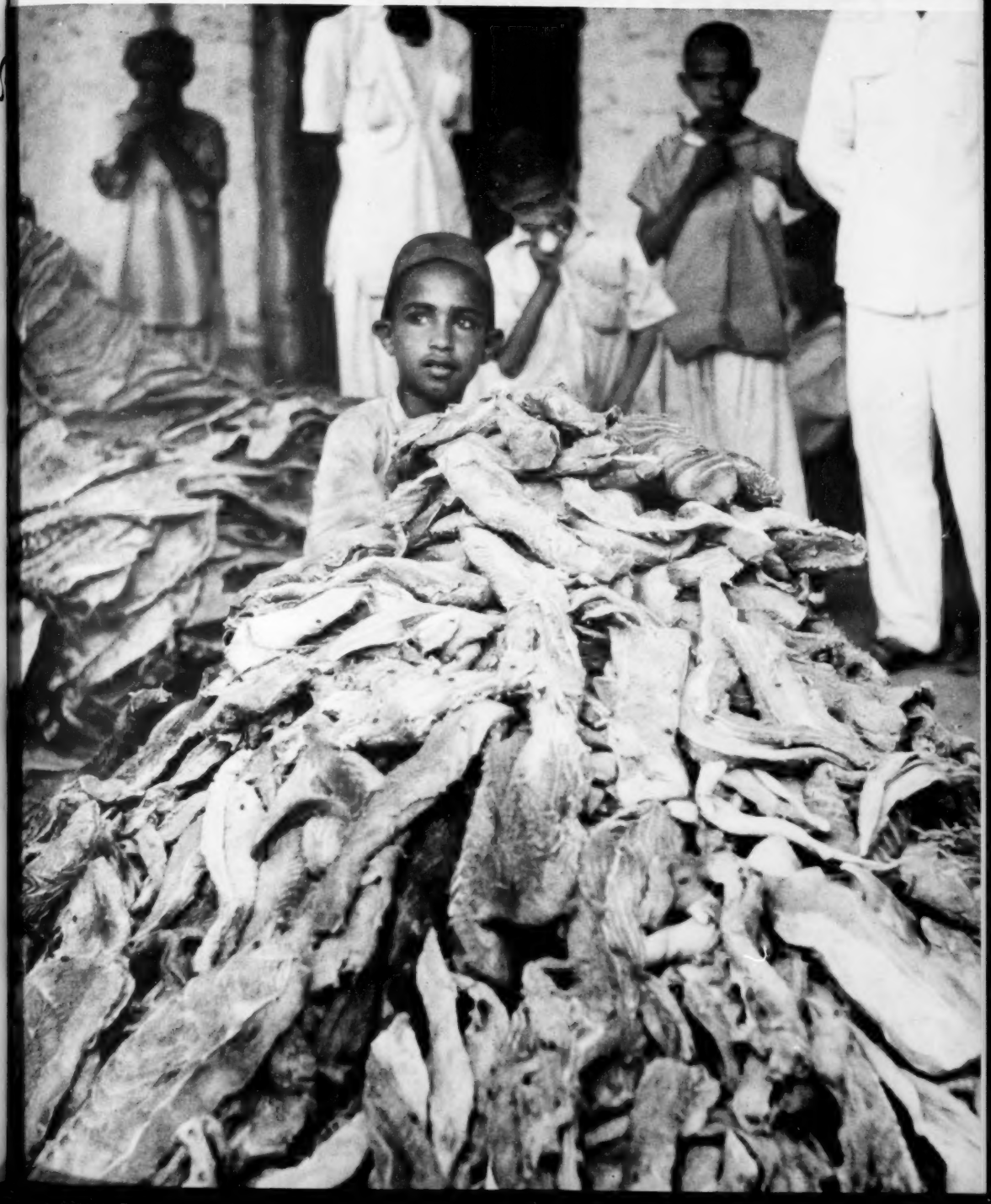
DIV OF FISHES

COMMERCIAL FISHERIES Review

VOL. 30, NO. 6 JUNE 1968



COVER: Dried shark for sale in Pakistan. Shark meat is soaked in brine pits and sun dried. It is bought mostly by Asian countries. Pakistanis prefer fresh fish.
(Photo: FAO/W. Williams)

COMMERCIAL FISHERIES

Review

A comprehensive view of United States and foreign fishing industries--including catch, processing, marketing, research, and legislation--prepared by the Bureau of Commercial Fisheries.

Fishermen's Memorial
Gloucester, Mass.

Managing Editor: Edward Edelsberg

Production Manager
and Associate Editor: Jean Zalevsky

Production: Alma Greene (Senior Compositor)
and Mary Andrews

The Bureau of Commercial Fisheries and
The Bureau of Sport Fisheries and Wildlife
make up The Fish and Wildlife Service of
The United States Department of the Interior.

Throughout this book, the initials BCF stand
for the Bureau of Commercial Fisheries.

Address correspondence and requests to: Commercial Fisheries Review, 1801 North Moore Street, Room 200, Arlington, Va. 22209. Telephone: Area Code 703 - 557-4246.

Publication of material from sources outside the Bureau is not an endorsement. The Bureau is not responsible for the accuracy of facts, views, or opinions of these sources.

Although the contents have not been copyrighted and may be reprinted freely, reference to source is appreciated.

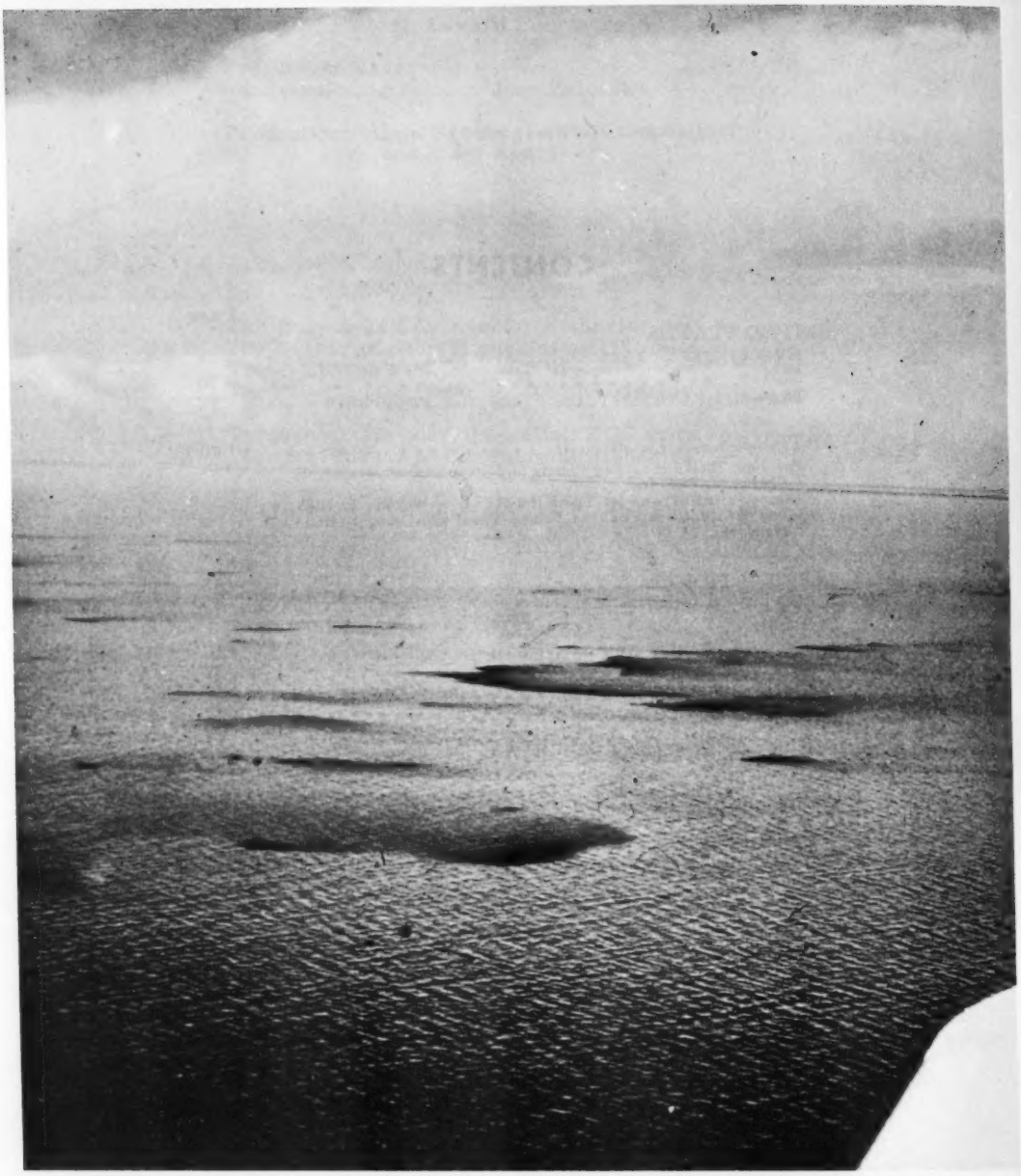
Use of funds for printing this publication was approved by the Director, Bureau of the Budget, April 18, 1968.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.
Price 60 cents (single copy). Subscription Price: $6.50 a year; $2 additional for foreign mailing.

Miss Wool,
direct
8-15-69
Shortage

CONTENTS

	Page
UNITED STATES	
Events and Trends	1
States	20
Bureau of Commercial Fisheries Programs	22
ARTICLES	36
The New Thread Herring Fishery in Eastern Gulf of Mexico, by Charles M. Fuss, Jr.	
Recent Innovations for Trawl Net Reel, by William L. High	
Safety for the Commercial Fishing Vessel and Crew, by John J. Murray	
INTERNATIONAL	53
FOREIGN	
Canada	56
Europe	57
Latin America	68
Asia	73
South Pacific	77
Africa	78
INDEX	79



Aircraft photo from 2,500 feet in Jan. 1967 of thread herring schools off West Coast of Florida. Not unusual concentrations for this area. (Photo: Johnny A. Butler.)

WORLD COOPERATION NEEDED TO REALIZE OCEAN'S POTENTIAL, BCF DIRECTOR SAYS

Scientists are developing remarkable technology to understand and exploit the riches of the oceans. But before the full potential of the oceans can be realized to benefit mankind, there must be increased international cooperation and understanding. This was the major theme of the talk by H. E. Crowther, BCF Director, to the Second FAO Technical Conference on Fishery Research Craft, held in Seattle, Washington, May 18-24.

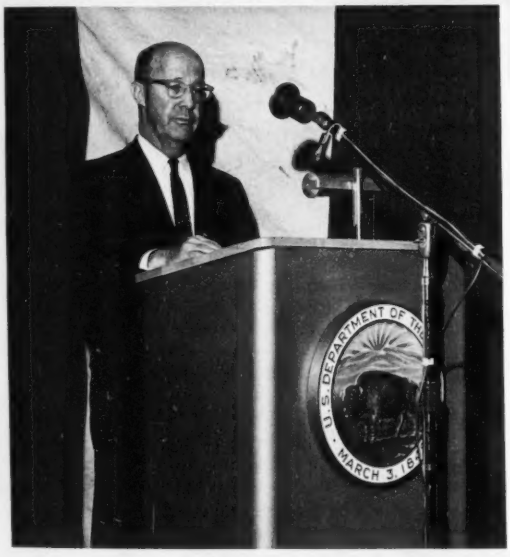


Fig. 1 - H. E. Crowther.

The conference, cosponsored by FAO's Fisheries Division and BCF, was attended by 150 persons from 20 nations. Jan-Olof Traung, Chief of FAO's Fishing Boat section, coordinated the conference.

Crowther recounted the development of research vessels and pointed to other forms of progress becoming visible on the horizon.

The first Food and Agriculture Organization (FAO) Conference on Research Vessels was held in Tokyo in September 1961. Thirty-four delegates from 12 nations exchanged information on design and operation of research vessels--particularly those required for fisheries research. The meeting, Crowther said, "represented the beginning of an unprecedented decade in the history of ocean sciences."

The 7 years since the Tokyo meeting were fat ones. Many nations began to investigate the oceans. More fisheries and oceanographic vessels were designed and built than in any period in history. In 1961, BCF had only one major, new, ocean-going research vessel: the "Albatross IV." Since then, it has added to its fleet the "David Starr Jordan," "Townsend Cromwell," "Miller Freeman," and "Oregon II." Other U.S. agencies have built 30 high-seas oceanographic research and survey vessels that contribute much to fishery development. These vessels can operate anywhere in the world. While the U.S. achievement is impressive--it has been duplicated by many maritime nations.

"Oceanographic Boom"

There has been an "oceanographic boom" in the past 10 years, BCF's Director said, a boom that benefited, at least financially, all sectors of ocean science.

The boom resulted partly from man's curiosity about the unknown and partly from dramatization and popularization of the science

Fig. 2 - David Starr Jordan.

Fig. 4 - Miller Freeman.

Fig. 3 - Townsend Cromwell.

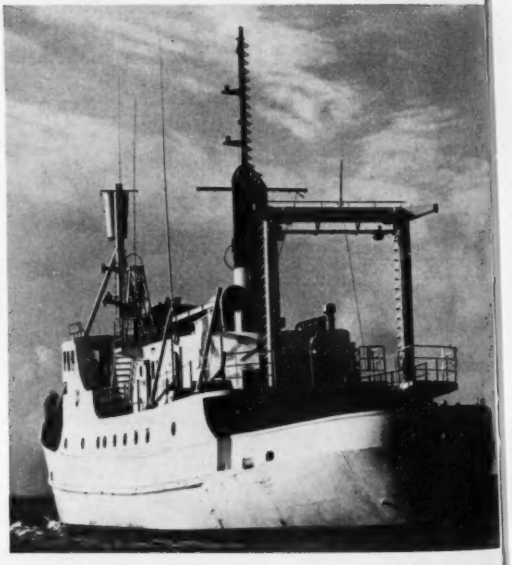


Fig. 5 - Oregon II.

Newest Major Members of BCF Fleet.

by the news media. But it also resulted from need--the need growing out of "demands for protein to feed a rapidly expanding world population."

Need for Food From the Sea

World fisheries--including "truly high-seas operations"--have grown faster in the past 20 years than in any other period. In 1967, the ocean yielded close to 50 million metric tons of fish and shellfish. Today, fish represent the major source of animal protein for about half the world's population. However, the world population explosion demands ever-greater food production.

Changing Emphasis in Fisheries Research

The questions marine scientists ask today differ from those asked not so long ago, Crowther said. "We are passing from the general descriptive phase of ocean science into a period of specialization." The research requires many new types of platforms. Fishery research vessels must be adaptable to more uses. They must handle complex equipment--operate large nets used by the fishing industry--provide laboratory space and equipment for data storage and analysis--and communication facilities for ship-to-shore transmission of research data.

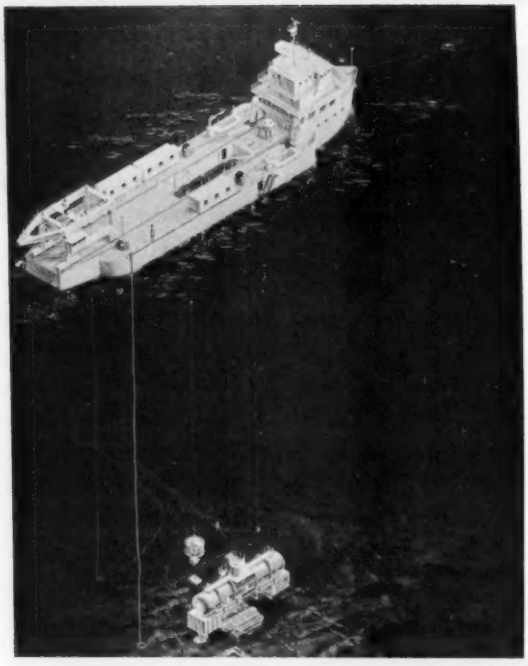
There is a "more applied tone" to marine research today. Scientists are seeking better means to find the ocean's living resources, to determine their numbers, and to extract them efficiently and profitably. They are studying means to predict variations in distribution and abundance of fish in time and space. They are developing procedures to achieve the largest catches in a period of time. They are developing better means of preserving fish and finding new uses for fish.

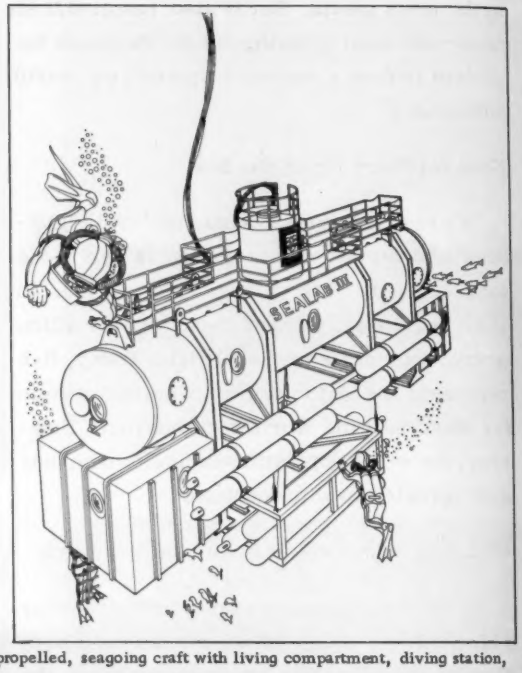
New Research Craft

New research craft have been designed to help the marine scientists. Many are conventional surface vessels for specific missions. But others add a new horizon to observation--the submersibles. Some can operate from surface waters to the greatest depths. In 1961, only a few existed. Now over 20 submersibles belonging to almost every major fishing nation operate in ocean depths between 1,000 and 15,000 feet. They investigate the behavior, distribution, and abundance of sea life--or they investigate the physical, chemical, or geological nature of the ocean and its seabed.

In the future, Crowther added, the research platform will include laboratory facilities built beneath the sea's surface. He outlined the Caribbean project slated for 1969 in which 4 scientists will live and work for 60 consecutive days on the ocean floor while isolated at 50 feet. The site is below the surface of Greater Lameshur Bay in the Virgin Islands National Park. The program involves the U. S. Navy, NASA, Interior Department, and the General Electric Co.

The program has two main purposes: (1) to conduct extensive marine science studies on the sea bottom--emphasizing the behavior and habit of marine animals and how they interact with their environment, and (2) to study the behavior of relatively isolated men under stress in an alien environment. The data can be useful to future underseas missions--and to extended-duration space missions.





Figs. 6 & 7 - Artist's concept of U. S. Navy Sealab III habitat--nonpropelled, seagoing craft with living compartment, diving station, observation room.

Cylindrical habitat is 12 ft. in diameter, 57 ft. long, with 2 rooms, each 8 ft. high and 12 ft. square, attached to bottom of habitat's hull.

Just above habitat is personnel transfer capsule used as pressurized elevator to ferry aquanauts to and from surface and ocean bottom. Both habitat and capsule have helium-oxygen atmosphere pressurized to equal surrounding sea-water pressure.

Starting October 1, 1968, for 60 days, habitat will be underwater base at depth of 430-450 feet off Southern California for 5 teams of 8 aquanauts. Each team will live 12 days under pressure, breathing an artificial atmosphere.

From the Air

Observational platforms have been raised to the skies. Scientists are exploring surface phenomena and near-surface sea life using airplanes and satellites. The achievements of satellites indicate a "possible large payoff in fisheries." Orbiting resource satellites may provide the data scientists need to predict the most promising places for abundant and available resources. Weather satellites are providing data on ocean storms and sea heights needed to route vessels expeditiously to fishing grounds. In the future, part of the job of those concerned with the sea will be done remotely from monitoring or drifting buoys, or remotely controlled subsurface vehicles and facilities.

Today, oceanographers and meteorologists, through the Intergovernmental Oceanographic Commission and the World Meteorological Organization, are planning an Integrated Global Ocean Station System (IGOSS). This system involves the worldwide deployment of ocean buoys and other platforms, such as merchant and fishing vessels, to monitor continuously the ocean surface, subsurface,

and overlying atmosphere. Data will be telemetered automatically to land stations, there to be analyzed and distributed to users, including fishermen. Fishermen may benefit greatly from this system through better weather forecasts and predictions of abundance and distribution of fishery resources.

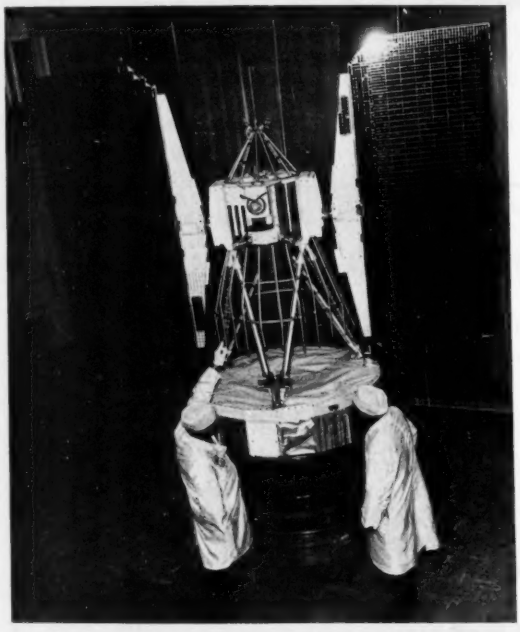


Fig. 8 - Spacecraft technicians check out NASA's 935-pound weather satellite Nimbus II. The large dark panels contain solar-cells that power complex electronic gear.

First NASA satellite to take and transmit directly to ground stations nighttime infrared photos of earth's cloud cover. (Photo: NASA)

The Potential Harvest

The fishery potential of the seas ranges between 200 million and 1,000 million metric tons. These are theoretical potentials based on the ocean's productive capacity. They can be realized only by developing the technology to harvest them--and the understanding of how these resources react to their environment and to man's exploitation. To benefit

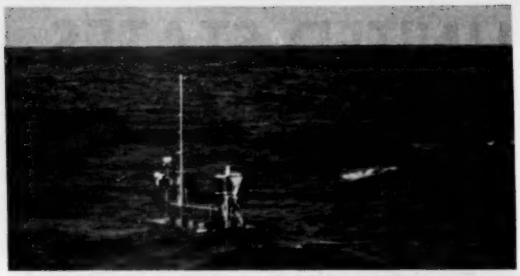


Fig. 9 - NOMAD (Navy Oceanographic Meteorological Automatic Device) buoy transmits data up to 2,000 miles--over standard 100 world-per-minute radioteletype circuits.
(Naval Oceanographic Office)

mankind, the information the scientists gain from the research vessel--and the technology developed to harvest the resources--must be passed on to the producer or processor.

To Benefit Mankind

Crowther stressed the importance of international cooperation to benefit mankind. President Johnson recognized this need, he said, by his proposal to Congress in March 1968 for an International Decade of Ocean Exploration to start in 1970. The full use of new research platforms, harvesting techniques, and the means to manage ocean resources all may be part of the ocean decade.

BCF's Director defined the challenge to the FAO conferees: "History may truly mark the 1970s as the decade in which nations were first able to work and plan together effectively in development and use of ocean resources for the benefit of all mankind. . . . We cannot, however, gauge progress in ocean science solely on the basis of tools we employ. The part or role that they may play in solving world food needs and proper use of the ocean's living resources must be measured in terms of increased ocean yields."

UNITED STATES

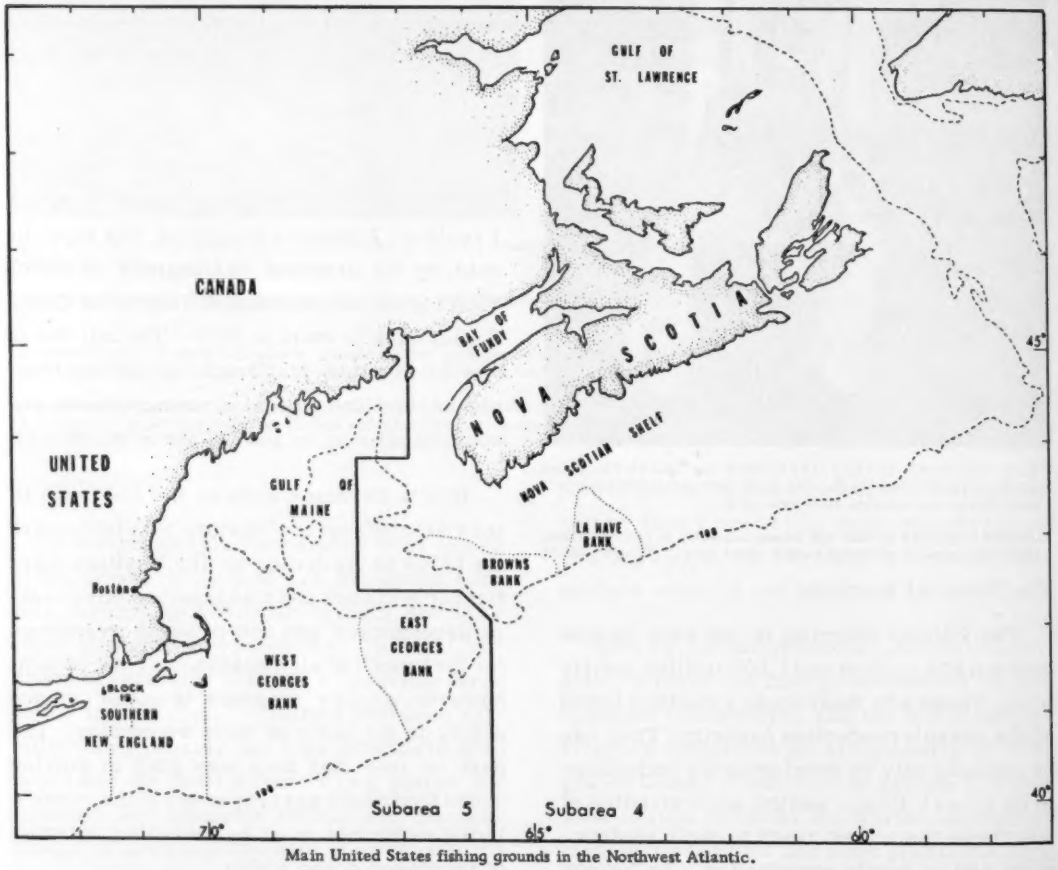
1967 New England Landings Show Ups and Downs

In 1967, New England fleets landed greater amounts of several important species and smaller amounts of others.

This information is contained in "Groundfish and Sea Scallops Fished by New England Fleets," a report by R. L. Schultz and F. A. Dreyer of the BCF Biological Laboratory at Woods Hole, Mass.

HADDOCK

U. S. haddock landings from Georges Bank in 1967 were 76 million pounds, round weight, or roughly 34 percent below the 116 million landed in 1966. Haddock abundance also declined: 8,600 pounds were landed per day fished in 1966 compared to 7,100 pounds in 1967. Lower scrod abundance accounted for this; it decreased from 6,600 pounds per day in 1966 to 4,200 pounds in 1967. Large-haddock abundance increased from 2,100 pounds per day in 1966 to 2,900 pounds in 1967.



Main United States fishing grounds in the Northwest Atlantic.

Age composition of Georges Bank haddock landings shows the shift of age group dominance during 1964-1967. Most noticeable in 1967, relative to other years, was the near-absence of 2- and 3-year-old fish (1964 and 1965 year classes). This was predicted from groundfish surveys in 1964 and 1965. Later surveys found the 1966 and 1967 year classes also very poor. With 4 successive small year classes on Georges Bank, below-average abundance and landings are expected to continue, at least through 1970. The year class failures had a more marked effect on seasonal fluctuations; large haddock were more abundant in the fourth quarter of 1967, but scrod were very low.

Noticeable in fourth-quarter age compositions are the significant numbers of one-year-olds. They were roughly 6 times more abundant than the 10-year average. This contradicts somewhat the research survey prediction of a poor 1966 year class, but faster growth may be responsible. The average length of one-year-olds in the fourth quarter (10-year average) is 36 centimeters. The 1966 year class averaged 39 centimeters in the fourth quarter. This increase in average size apparently is enough to put them into the selection range earlier than normally would occur. However, with the low abundance of scrod, the market demand would be higher. This would create a tendency to land smaller fish and make it more difficult to determine if a real change in growth has taken place.

Browns Bank

U. S. haddock landings from Browns Bank were 3.9 million pounds in 1967 compared to 1.8 million pounds in 1966. This increase resulted from increased scrod abundance. A trend of increasing abundance on Browns should continue until the 1962 and 1963 year classes are fully recruited. No samples were available for age compositions in 1967.

The fourth-quarter 1967 results do not indicate any change in abundance from 1966. The figures are based on less than 100,000 pounds and may not be indicative.

YELLOWTAIL

Yellowtail landings in 1967 were 52 million pounds, almost 18 percent below 1966's 63 million pounds. Yellowtail abundance increased from 4,400 pounds per day in 1966 (Georges Bank) to 5,000 pounds per day in 1967. On Southern New England Grounds (SNE), it increased from 4,500 pounds per day in 1966 to 5,100 pounds in 1967.

Age compositions in 1967 (All Grounds) show the 2- and 3-year-olds in good abundance. This accounted for the increase in overall abundance in 1967. These 2 year classes appear somewhat large relative to other years and should contribute to increasing abundance and landings in 1968.

In fourth-quarter 1967, 2-year-olds were more numerous than usual in Georges Bank landings, but they were less so for Southern New England. This is largely the cause of the quarterly changes in landings-per-day estimates, as fishing effort in 1967 dropped below the levels of 1965 and 1966.

COD

Cod landings by the U. S. from Georges Bank rose from 21.9 million pounds to 23.6 million pounds in 1967. Total U. S. landings increased about one fifth while landings per day dropped slightly.

Quarterly landings per day indicate some degree of increased catch rate in second-half 1967.

REDFISH

Redfish landings by the U. S. from all New England grounds (Gulf of Maine and Georges Bank) were up about 7 million pounds in 1967. Landings per day remained about the same. Redfish landings from the Nova Scotian shelf dropped from 37 million pounds in 1966 to 14 million pounds in 1967. This decline was accompanied by about a 23 percent drop in landings per day. Redfish landings by all countries doubled in 1966 after declining in 1964 and 1965. Redfish landings by the U. S. from the Gulf of St. Lawrence in 1966 were 28 million pounds; in 1967, 34 million pounds. Landings per day increased from 46,000 pounds per day in 1966 to 55,000 in 1967.

SILVER HAKE
(Food Fishery)

The U. S. silver hake food fishery, located principally in the Gulf of Maine and on the cultivator shoals of Georges Bank, declined 28 percent in landings in 1967. Labor disputes and large freezer holdings left over from 1966 were influential. Landings per

day in 1967 for Georges Bank increased slightly. However, abundance in the Gulf of Maine was down about half for the year, and about 80 percent in the fourth quarter.

INDUSTRIAL FISHERY

U. S. industrial landings from New England and Middle Atlantic waters in 1967 were 85 million pounds--about 16 percent below the 102 million landed in 1966. As red and silver hake landings remained about the same in 1966 and 1967, the decline was principally among other species.

Species compositions indicate red and silver hake percentage in the catch was slightly higher in 1967 than in 1966.

The landings-per-day estimate for industrial silver hake (SNE grounds) was 17,000 pounds in fourth-quarter 1967 compared to 8,400 pounds in 1966. This increase in abundance was accompanied by a million-pound increase in landings in fourth-quarter 1967 compared to 1966. Red hake abundance increased from 7,600 pounds per day in 1966 to 21,000 pounds in fourth-quarter 1967; in the latter period, landings of red hake increased 3 million pounds over the 1966 period. Middle Atlantic landings have declined in importance since the Amagansett plant on Long Island was closed.

SEA SCALLOPS

U. S. sea scallop landings for Georges Bank increased 750,000 pounds in 1967, but Middle Atlantic declined by about 50 percent. This lowered total landings by about 5 million pounds. Landings per day on Georges Bank declined slightly for the year--in contrast to the research-vessel index indicating an increase in abundance. Landings per day on the middle Atlantic grounds continue the declining trend evident since 1965.

Contracts to be Awarded for Cleanup of Dead Alewives in L. Michigan

The Department of the Interior will award contracts for leasing 16 fishing boats to net dead alewives in Lake Michigan before they pollute beach waters.

Millions of alewives, small herringlike fish, died in summer 1967.

Plan Of Action

The lake is full of alewives. If the expected die-off occurs, the boats will take the dead fish to docking areas. The fish will be pumped into vehicles supplied by local communities and taken to disposal sites designated by the area authorities.

The alewife program resulted from a Federal-State enforcement conference held in Chicago, Ill., recently to help curb Lake Michigan pollution.

The Department of the Interior has agreed to contribute up to $250,000 for netting the dead fish. The 4 Lake Michigan States--Indiana, Michigan, Illinois and Wisconsin--have been asked to give up to $62,500 each.

Areas Protected

The skimming operation will protect daily 20 miles of shoreline in each State--a total of 80 miles. The areas to be protected include:

Illinois--Chicago area beachfront and waterfront.

Indiana--Gary, Michigan City, and Dunes State Park.

Wisconsin--Milwaukee and Racine-Kenoska areas.

Michigan--Benton Harbor-St. Joseph area and Grand Haven.

A fixed net will be set up off Saugatuck, Mich., as an experiment to determine if this can block dead alewives from being washed ashore.

1967 Great Lakes Production Is Greatest Since 1956

Total commercial fisheries production from the Great Lakes has increased for the third consecutive year. In 1967, U. S. and Canadian fishermen reported 124.8 million pounds, the largest harvest since 1956, and one of the ten highest since 1879, the earliest year of recorded data.

U. S. fishermen took 64.2 percent--80.1 million pounds, 12.3 million pounds over 1966.

The 1967 Canadian catch was 44.7 million pounds, about 3.1 million pounds less than 1966; the bulk of the decline was in Lake Erie. Despite this decline, the total catch was the fifth largest since 1879.

U. S. Alewife Fishery Larger

The increase in U. S. production can be attributed largely to intensification of the alewife fishery in Lake Michigan. The landing of almost 42 million pounds, 12 million pounds above 1966, was the fourth highest of any one species since 1879. Only catches of lake herring in Lake Erie in 1889, 1890, and 1918 were greater.

L. Michigan No. 1

The Lake Michigan catch was almost 57.2 million pounds, 14.4 million over 1966, and a record catch from the lake. Alewives were 73 percent of the catch; chub, 17 percent.

Lake Michigan displaced Lake Erie as the leading producer of fish; its landings exceeded Lake Erie's by about 7.8 million pounds. Excepting one year (1903), Lake Erie had always led the other lakes.

L. Erie Production

Lake Erie catches declined substantially--3.6 million pounds in Canadian waters, and 1.1 million pounds in U. S. waters. Ohio's 1967 catch fell to a record low.

Yellow perch presently accounts for more than half (52 percent) of total landings.

Smelt contributes substantially to the catch in Canadian waters.

The walleye once was a principal species. Average catch by U. S. and Canada from 1945 through 1957 was 5.3 million pounds. The catch has been decreasing steadily; in 1967, it was 1.2 million pounds, nearly 60 percent in Canada.

Lake Superior

In Lake Superior, U. S. fishermen took 454 thousand pounds less than in 1966; Canadian fishermen reported 705 thousand pounds more. Lake herring, formerly very prominent, continues to decline.

Lake Ontario

Both U. S. and Canadian fishermen reported increased catches in Lake Ontario--40 thousand and 179 thousand pounds, respectively. Today, white perch makes up bulk of the catch. It has increased steadily. Whitefish, formerly the dominant species, now is almost nonexistent.

Lake Huron

U. S. and Canadian fishermen in Lake Huron also reported decreased catches--558 thousand and 346 thousand pounds, respectively. The decrease is attributable primarily to smaller landings of chubs.

Catfish Farmers Form Trade Group

Fish farmers of 8 states have formed a trade association: "Catfish Farmers of America." Meeting in Greenville, Miss., April 29-30, the farmers from Arkansas, Alabama, Louisiana, Oklahoma, Mississippi, Texas, Georgia, and Tennessee developed by-laws for the new association and set its goals: 1) to promote the "image" of pond-cultured catfish and to improve opportunities for selling them profitably; 2) give the farmers a common voice in dealing with Federal and state governments to achieve better relations; 3) to set up a trade journal that will provide good communication within the industry. In the beginning, "American Fishes Magazine" will be used.

Each farmer who joins the association will be assessed annually $1 per acre in fish production. The maximum per member is $500, the minimum $25.

Blue Crab Deaths Increase in S. Carolina-Georgia Area

During spring 1966, 1967, and 1968, greater than normal numbers of dead and dying blue crabs were reported from the S. Carolina-Georgia area. Scientists from BCF's biological laboratory at Oxford, Maryland, are working with Robert Lunz, director of Bears Bluff Laboratories in S. Carolina, to determine the cause.

In mid-May, microscopic examinations of crab samples showed an infestation of an amebic parasite thought to be the cause of "grey crab disease."

BCF scientists will continue to work with state scientists on this problem.

1968 Import Quota for Tuna Canned in Brine

The quantity of tuna canned in brine that may be imported into the U. S. during 1968 at the 11-percent rate of duty is limited to 66,985,048 pounds. This is about 3,189,764 standard cases of 48 7-oz. cans. The limit is about 3.6 percent less than the 69,472,200 pounds (about 3,308,200 cases) in 1967; 2 percent over 1966's 65,662,200 pounds (about 3,126,771 cases); 1.4 percent greater than the 66,059,400 pounds (about 3,145,685 cases) in 1965; and 10 percent over the 60,911,870 pounds (about 2,900,565 cases) in 1964.

22% Duty Above Limit

Any imports of tuna canned in brine over the 1968 quota will be dutiable at 22 percent ad valorem under item 112.34, Tariff Schedules of the U. S.

The 1968 quota is based on the U. S. pack of canned tuna during the preceding calendar year (1967), as reported by the U. S. Fish and Wildlife Service.

First Quarter Imports

U. S. imports of tuna canned in brine during Jan. 1-Mar. 30, 1968, were 14,616,675 pounds (about 696,032 standard cases). These are preliminary data of the Bureau of Customs, U. S. Treasury Department.

2nd Boston Fish Expo Set for October

The second American Commercial Fish Exposition will be held in Boston, Mass., October 16-19, noon-6 p.m. The new location is the War Memorial Auditorium at the Prudential Center. Preparations for parking, registration, and hotel accommodations are well advanced.

Larger Affair

The first Expo last year was limited to the trade. It drew over 17,000 registrants. This year's is expected to be an altogether larger show.

Information may be obtained from: Second American Commercial Fish Exposition, Inc., 3 School Street, Boston, Mass. 02108, phone 742-0334.

GULF AND CARIBBEAN FISHERIES INSTITUTE ANNUAL MEETING

The 21st Annual Meeting of the Gulf and Caribbean Fisheries Institute will be held at the Hilton Plaza Hotel, Miami Beach, Fla., Nov. 17-21, 1968.

The Institute has issued a call for papers on the following topics: "industry problems related to labor, sanitation standards and inspection; culture of marine animals; international use of high seas resources; and Caribbean fisheries." Papers with a title and an abstract will be considered for inclusion on the program. These should be sent to the Executive Secretary, Gulf and Caribbean Fisheries Institute, 1 Rickenbacker Causeway, Miami, Fla. 33149. Presentation time for all papers is strictly limited to 20 minutes, followed by a discussion period. Manuscripts will be published in the Institute's annual "Proceedings" and may be longer than the version presented orally.

The Institute is a membership organization; the scientific membership fee is $5 per year, the industrial membership fee $25. Membership may be obtained prior to the meeting, or upon registration. Also, a registration fee of $15 is charged for attendance at the annual meeting.

The International Game Fish Conference will hold its 13th Annual Meeting, Nov. 22 and 23, immediately after the Institute's.

OCEANOGRAPHY

'Uses of the Seas' Is Theme of 'American Assembly'

"In the last third of the 20th century, the sea offers new horizons to government policy and to private business, to the scientist and to the lawyer, to the sailor and to the shore-bound, to the miner and the fisherman, to the strategist and economist, to the old seafaring nations and to the newcomers among the 100-odd states which border the oceans." This statement introduces the final report of the 33rd American Assembly, which met at Arden House, Harriman, New York, May 2-5.

The American Assembly, an affiliate of Columbia University, was established by Dwight D. Eisenhower in 1950. It conducts nonpartisan meetings and publishes books illuminating important issues of U. S. policy.

The 33rd Assembly was attended by 72 persons from the fields of science, engineering, business, government, law, communications, and religion. They reached general agreement on a final report. Most of their recommendations appear below.

Peaceful Uses

In the peaceful uses of the sea during the next 10 years, the "primary interest will be in the harvest of food and in minerals." The Assembly recommends that in planning to exploit the seas high priority be given to living resources.

The yearly harvest of fish and shellfish is over 55 million tons. It can be quadrupled without exhausting fish stocks--if international conservation is practiced. Through fish protein concentrate (FPC) and other food products, the sea could contribute significantly to providing high-quality protein to a world population of 5 billion persons. Aquaculture can expand marine produce--especially shellfish of higher commercial quality.

Minerals

The most valuable minerals will continue to be oil and gas; already, over one sixth comes from offshore wells. The continental shelf and slope probably will provide the largest new reserves. "Within ten years all these reserves will probably be technologically, if not economically, exploitable."

Weather & Oceanic Forecasting

Improved knowledge of the interaction between atmosphere and sea offers the prospect of much better weather and oceanic forecasting. It offers too the possibilities of modifying weather. "Any unilateral action for major climate modification should be subject to international control," the Assembly suggests.

Decade of Ocean Exploration

The Assembly supports President Johnson's call for an International Decade of Ocean Exploration: It believes: "Given the expanding prospects at sea, it is urgent to take measures to accommodate competing uses, to promote conservation, to refine the laws, to negotiate the appropriate international agreements, and to create international machinery to assist in the scientific investigation of the seas and in orderly development of sea resources."

Military and peaceful uses can conflict. Also, civil uses can be incompatible; as, for example, mining and fishing in the same areas. Resolving such conflicts requires more urgent attention on national and international levels. "The ominous problem of pollution must be similarly attacked."

Law of the Seas

It is necessary to redefine the width of the territorial sea and of the continental shelf. A "new and certain law for the deep ocean floor" should be developed to forestall unilateral national action and "undesirable precedents."

The Assembly proposes that:

- The territorial sea should be as narrow as possible. It might be up to 12 miles, provided freedom of passage through all international straits is assured.
- The deep sea bed should not be subject to "national appropriation by claim of sovereignty."
- There should be early international agreement on new management of the deep sea bed to encourage exploration and exploitation.

• The legal concept of the continental shelf in the 1958 Geneva Convention should be redefined. It should eliminate as unworkable the clause giving coastal nations sovereign rights to mineral resources in adjacent areas beyond the 200 meter depth, wherever these resources can be exploited.

• The redefined shelf should be "narrow, not wide, preferably not beyond the 200 meter depth."

• Until revised, the U. S. should announce its intention not to claim permanent exclusive rights to natural resources of the sea bed beyond the 200 meter depth. The U. S. would go on issuing licenses to exploit adjacent areas beyond that depth. But this would be subject to the condition that it would transfer to an international body that might be established for the resources of the deep sea bed any licenses in areas subject to that body. The U. S. should urge other nations to do the same.

The U. S. should support the creation of international body within the United Nations responsible for the exploitation of nonliving resources in the deep sea floor. This body might:

--issue licenses and regulate agreed activities;

--collect an agreed share of revenues for international purposes, including aid to developing nations;

--refer disputes to international arbitration or adjudication;

--encourage research, exploration, and investment.

Living Resources

Concerning the seas' living resources, the Assembly is convinced that stronger regulatory machinery "is urgently required to avoid economic and physical wastes such as occur in current fishing practices." It should include "management of the harvesting and farming of such resources."

Coastal Zones

Concerning fishing in coastal zones, the U. S. should seek a new international agreement on territorial waters to hold the boundary for exclusive fishing rights as close as possible to coast lines. Incentives should be provided for coastal nations to limit their exclusive fishing rights to 12 miles.

Organization of U. S. Marine Policy

The Assembly recognizes several critical factors in U. S. Government organization for marine policy:

• An important first step toward adequate organization was Public Law 89-454. It created an interim National Council on Marine Resources and Engineering Development to implement and improve ocean policy. It set up a Presidential commission to make recommendations for the future.

• There are too many government agencies and their activities are too dispersed.

• Private investment must be encouraged, along with strengthening Government machinery.

• The importance of the international dimension in ocean affairs requires improved formulation of U. S. policy.

Goals Worth Achieving

The Assembly concludes: "The stakes at sea are high and a commensurate investment might be several times higher than the one half billion dollars which the federal oceans program now receives annually from the Congress.

"The Assembly believes that the growth of international cooperation on and in the seas will strengthen the world economy and build the peace. It is convinced that Americans should begin thinking about the oceans as a major concern, somewhere in the scale which includes outer space, urban problems, transportation, public health, foreign aid, and the world population explosion."

Nautical Charts for Texas Intracoastal Waterway

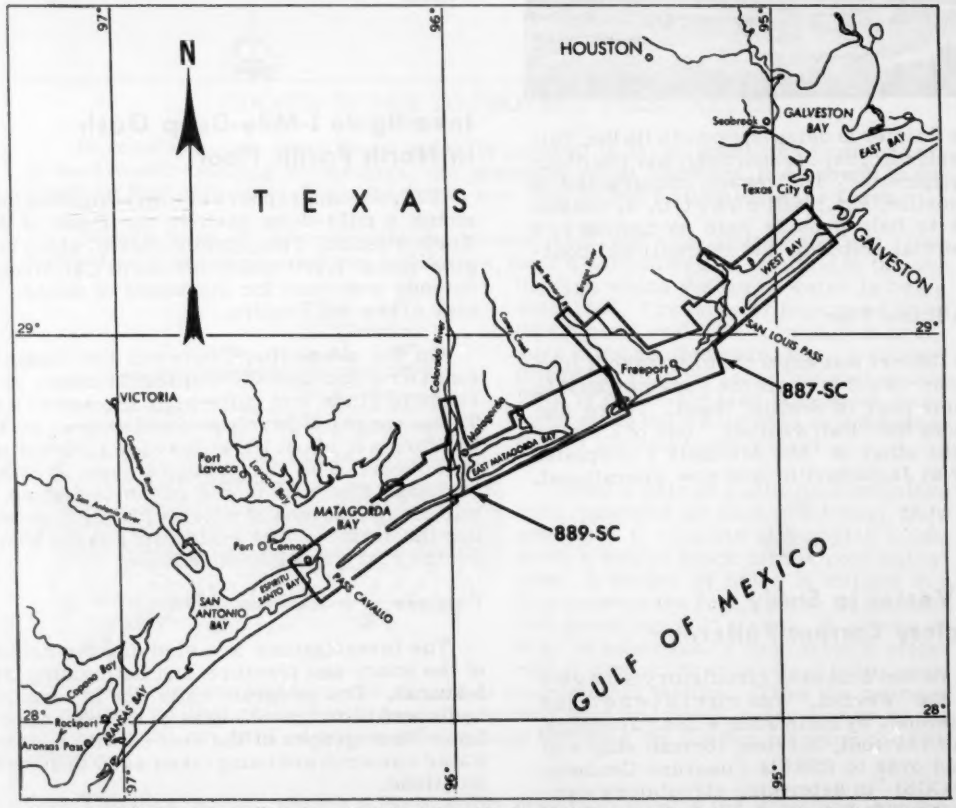
Two new small-craft nautical charts covering key sections of the Gulf Intracoastal Waterway in Texas have been published by the Coast and Geodetic Survey. The accordion-folded charts are part of a series designed to span the giant half-circle of the Gulf Coast. They bridge 2 of the Nation's busiest commercial and recreational boating areas, Galveston and Matagorda bays.

120 Miles Covered

When joined, the charts cover about 120 miles of the Gulf's Intracoastal Waterway for commercial shipping and recreational boating. The waterway was improved to a controlling depth of 12 feet. It carried more than 71½ million tons of commerce by barge and small freighters in 1964. The traffic exceeds original estimates by 500 per cent--and is still expanding. The new charts (887-SC and 889-SC) include topographic features based on 1965 and 1967 aerial photography by the Coast and Geodetic Survey.

New information benefits the more than 223,000 recreational boaters registered by the state in 1967.

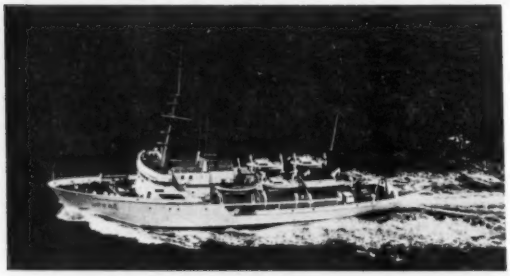
The charts were produced at the scale of 1:40,000. They may be purchased for $1.50 each from Coast and Geodetic Survey nautical chart agents, or from the Coast and Geodetic Survey (C44), Rockville, Md. 20852.



Area covered by two new small-craft nautical charts issued by the ESSA Coast and Geodetic Survey for the Intracoastal Waterway in Texas.

'Rainier' Is 14th Vessel in Coast & Geodetic Fleet

A 231-foot, 1,627-ton vessel--the "Rainier"--has become the 14th hydrographic and oceanographic survey vessel operated by the Coast and Geodetic Survey (CGS). GCS is part of the Environmental Science Services Administration (ESSA) of the U. S. Department of Commerce.



The Rainier is being equipped with the "latest electronic, depth recording, and positioning equipment." The vessel, constructed in Jacksonville, Fla., will chart U. S. coastal waters to help provide safe navigation for commercial shipping and recreational boating.

Seattle Home Port

The Rainier was expected to sail about June 4 on a one-month trip via the Panama Canal to her home port of Seattle, Wash. There she would join the "Fairweather," one of 2 sister ships (the other is "Mt. Mitchell") completed earlier at Jacksonville and now operational.

ESSA Vessel to Study Circulatory Current Patterns

The nation's newest circulatory survey vessel, the "Ferrel," was christened and commissioned by ESSA June 4 near Jennings, La. The 133-foot, 300-ton, 16-man ship will be turned over to ESSA's Coast and Geodetic Survey (CGS) "to determine circulatory current patterns in the coastal and estuarial waters of the east and gulf coasts." She is the first vessel built in U. S. specifically for such work. She will operate with a 59-foot auxiliary buoy tender. Home port for Ferrel and tender is Norfolk, Va.

The Ferrel will be base ship for the TICUS (tidal and current survey) system developed by CGS. She will receive telemetered information from TICUS buoys, tend buoy systems, and transport equipment from site to site.

The Ferrel was named after Professor William Ferrel, a 19th century pioneer scientist. He contributed much to the knowledge of tidal phenomena.

The Ferrel cost $690,000. She will carry 15 buoys and 48 sensors. Her first assignment will be in Louisiana waters near New Orleans. She will continue an earlier survey to determine the circulatory pattern of currents in the Mississippi River-Gulf Outlet Canal, Chandeleur Sound, and Breton Sound.

Investigate 1-Mile-Deep Gash in North Pacific Floor

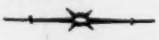
U. S. oceanographers are investigating this month a mile-deep gash in the floor of the North Pacific. The gigantic chasm, which begins about 1,000 miles off north California, extends westward for thousands of miles. It may cross the Pacific.

On the ocean floor, between the chasm's eastern end and the California coast, is a range of cliffs and mile-high mountains. These range in width from 4 miles near north California to about 100 miles wide 1,000 miles to the west. The chasm begins here. It is an immense fracture in the ocean bed about 1 mile deep and tens of miles wide, 3 miles below the surface. The entire area is the Mendocino Scarp and Fracture Zone.

Purpose

The investigators are studying the origin of the scarp and fracture and delineating its features. The program calls for 20 dredge hauls and 12 sediment cores of the ocean bottom. Photographs of the seabed with underwater cameras are being taken at 20 different locations.

The investigation is being conducted from ESSA's USC&GSS "Oceanographer," a Seattle-based electronically equipped oceanographic survey vessel.



Book Answers 100 Questions About the Oceans

A 120-page, $5\frac{1}{2}$x$8\frac{1}{2}$-inch book that answers 100 "Questions About the Oceans" has been issued by the National Oceanographic Data Center (NODC), which is managed by the Naval Oceanographic Office.

The questions include: "What is green scum?" "Why is the ocean salty?" "What is the hydrologic cycle?" "What causes the hydrogen sulfide concentration at the bottom of the Black Sea?" "What universities and colleges have oceanographic courses?" "Who hires oceanographers?" Many questions are illustrated, some humorously. Each answer contains a guide to further reading.

Brief & Clear Answers

The publication was written by Harold W. Dubach, NODC Deputy Director, and Robert W. Taber, (Acting) Director of NODC's Quality Control Division. They selected the questions from thousands about oceanography and answered each briefly and in language secondary school students can understand.

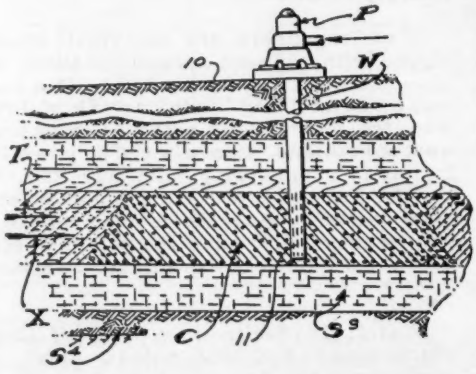
A paperback copy of "Questions About the Oceans" is available for $.55 from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Correction: In May CFR, p. 9, caption under U. S. Navy's vessel "Kane" should have read: "USNS" not "USGS".

PUMPED-IN DAM TO PROTECT FRESH WATER

In coastal areas, when fresh water is pumped in large quantities from underground water-bearing formations, the pressure often becomes low enough in the aquifers that salt water from the ocean can leak in and contaminate the fresh.

Several ways of preventing this have been tried, but with limited success. One method, now in use in southern California, uses a second well in addition to the one through which the fresh water is being extracted. Fresh water is pumped down this second well both to maintain pressure in the aquifer and to keep a current flowing against the incoming salt water. This is obviously less than ideal, however, since the whole idea is conservation of limited fresh water.



Now a pair of California inventors have patented an idea which may show promise: It consists of pumping a dam down a well to block off the contamination. A series of holes is drilled in a line between the fresh water supply and the incoming salt water. A slurry of clay of other non-water-soluble material is pumped down the first hole, while fresh water is removed from the second in conventional fashion. Then the process is shifted so that slurry goes down the second hole and fresh water comes up the third, and so on until a wall has been built blocking the aquifer off from the salt water.

The idea would require a lot of solid material, admits the inventors, but the drilling mud used in oil wells provides an obvious source. Its use would also relieve the oilmen of the cost of disposing of it. (Reprinted, with permission from "Science News," weekly summary of current science, copyright 1966 by Science Service, Inc.)

Foreign Fishing Off U. S. in April

OFF ALASKA

Japanese: Between 130 and 135 Japanese vessels fished off Alaska through April--20-25 more than in late March. The increase was due to arrival of another factoryship in eastern Bering Sea, more reefers and cargo vessels, and a slight increase in independent trawlers.

The factory trawlers in Pacific ocean perch fishery in Gulf of Alaska increased from 6 to 7 in early April and remained at 7 through month. During first-half April, the 7 were scattered off southeast Alaska, on Fairweather Ground, and on Yakutat grounds in eastern Gulf. About mid-month, 5 vessels shifted to Middleton Island grounds in Central Gulf; in late April, the same 5 shifted farther west in central Gulf to Albatross Bank and Chirikof Island area. Between 7 and 10 independent factory trawlers (500 to 3,500 gross tons) fished for perch along 100-fathom curve in eastern and central Bering Sea through April. The primary area was along curve from just south to just northwest of Pribilofs. The factoryship "Chichibu Maru" replaced the factoryship "Meisei Maru No. 2" in central Bering Sea in early April and assumed the latter's 7 trawlers. This fleet fished along 100-fathom curve northwest of Pribilofs through April, presumably for ocean perch.

The factoryship fleets engaged in minced fish meat and fish meal production in eastern Bering increased from 3 to 4 in early April when the fourth, with 16 trawlers, arrived. All 4 fleets concentrated on Alaska pollock grounds north of Fox Islands in eastern Aleutians during most of April; but at month's end, 3 fleets had moved to Continental Shelf north of Unimak Island in eastern Bering.

The two crab factoryships, accompanied by 16 vessels, remained on Continental Shelf north of Alaska Peninsula in eastern Bering. In late April, however, 4 tangle-net setters were reported near Pribilofs. In 1965 and 1966, one fleet and, in 1967, both fleets shifted to Pribilofs in late May and early June. The 4 net-setters in Pribilof area in April meant fishery again will be shifted there--but earlier than previously. This early movement presumably is due to fact that Japanese crab fleets, like Soviet, are catching predominately tanner rather than king crab on Continental Shelf north of Alaska Peninsula. Unlike Soviet, however, the Japanese fleets, besides fishing tangle-net gear, also are fishing pots, which are more selective for tanner crab. One fleet reportedly was using 4,000 tanner crab pots, 400 larger pots designed for king crab, and 600 medium dual-purpose pots--and carrying a full complement of tangle-net gear. The other fleet was using principally tangle-net gear, but it also was working 500 tanner crab pots and 200 larger pots for king crab. In early April, the first fleet's average daily catch was reported between 20 and 60 metric tons, 90 percent tanner. The other's production in early April was 3,900 cases of king and 1,500 cases of tanner. Although only 28 percent of cases packed by this fleet consists of tanner crab meat, about an equal number of king and tanner crab was caught. Because tanner are smaller, more are needed to produce a case.

During April, at least 10 long-liners fishing for sablefish were active off Alaska--all in eastern Gulf of Alaska. The number varied from 3 to 6. Observations of one long-liner indicated it may be using diver gill nets, fished just off ocean floor, rather than long-line gear. This gear was used by Japanese in Gulf of Alaska in 1963; the catches were almost entirely sablefish.

Two long-liners and one small trawler, rigged with gear not normal for them, were observed in Bering Sea in April. One vessel was on Bristol Bay "flats" south of Togiak Bay; the other two in central Bering northwest of Pribilofs. It is believed they are fishing gill nets for herring. However, the small trawler in the central Bering had a variety of gear, including glass floats and crab pots; it was equipped with table and roller on stern. This vessel possibly was engaged in exploration.

Soviet: The decline in vessels off Alaska, which began in Feb. 1968, ended in April. The number remained over 70 through month, with considerable weekly fluctuations.

The Pacific ocean perch fishery (6 vessels) was confined to Aleutians through April. By mid-April, when flounder fishery in eastern Bering had disbanded, this fleet increased to about 12 medium trawlers supported by 2 refrigerated carriers. It continued at that level through month.

The shrimp fishery on Portlock Bank just east of Afognak Island in central Gulf of Alaska continued at increased level through April. The two "Zakharov"-class canning factoryships remained, as in March 1968; but in early April, medium freezer trawlers increased from 15 to about 20.

Flounder fishing in eastern Bering, which began to decline in March, was discontinued in mid-April.

In early April, trawlers north of eastern Aleutians switched emphasis from deep-water trawling for sablefish and turbot to trawling along Continental Shelf edge for groundfish; these consisted mostly of pollock, flounders, perch, gray cod, and sablefish. By mid-month, fishery was extended along Continental Shelf edge into central Bering; and, operating between Unimak Pass to well northwest of Pribilofs, were over 20 trawlers and 1 to 3 refrigerators. By end of April, fleet was concentrated in 2 areas: north of eastern Aleutians near Unimak Pass (5 vessels) and along 100-fathom curve in central Bering northwest of Pribilofs.

erated off U. S. Pacific Northwest during April. The stern-trawler concentrated on ocean perch and appeared doing well. A single haul off Oregon appeared to be about 14,000 pounds of ocean perch, the largest single haul seen taken by this vessel.

Soviet: 54 different fishing and support vessels were sighted. In March 1968, only about 20 such vessels were sighted off Washington and Oregon. The number increased rapidly each week during April until it reached peak of 39 in fourth week (see table). This indicated beginning of Pacific hake season.

By type, the 54 were: 12 stern factory and freezer trawlers; 29 medium trawlers; 10 processing and support vessels; and 3 research vessels. The mix is similar to previous years with one exception: a few more stern trawlers in 1968.

Most fishing was off Washington until about mid-April, when entire fleet concentrated off Oregon (see table).

Catches in first part of April off Oregon and Washington appeared mostly Pacific

Soviet Fishing Vessels Sighted Off U. S. Pacific Northwest in April 1968

Week Ending	Area	Type of Vessel					
		Medium Side Trawlers	Stern Factory Trawlers	Support Vessels	Research Vessels	Tugs	Total
Apr. 4	Wash.	10	-	3	-	1	14
	Oregon	2	3	-	-	-	5
	Total	12	3	3	-	1	19
Apr. 11	Wash.	7	1	6	1	1	16
	Oregon	5	4	0	0	0	9
	Total	12	5	6	1	1	25
Apr. 18	Wash.	-	-	-	-	-	-
	Oregon	18	8	5	2	1	34
	Total	18	8	5	2	1	34
Apr. 25	Wash.	-	-	-	-	-	-
	Oregon	18	10	8	1	2	39
	Total	18	10	8	1	2	39

Two Zakharov-class canning factoryships, accompanied by 7 net-setting trawlers, were active in king crab fishery on Continental Shelf in eastern Bering through April. As previously, the fishermen were using only tangle nets; however, this year their catches consist also of tanner crab. King crab catches prevailed in previous years; this year, the proportion of tanner was at times as high as 50-95 percent of total crab catch.

OFF PACIFIC NORTHWEST

Japanese: Two vessels, one a stern-trawler and the other a support vessel, ocean perch and other rockfish. During latter part, when hake began running off Oregon, catches up to 10,000 pounds per drag were observed.

Research vessels of Pacific Institute for Fisheries and Oceanography (3 medium trawlers) were sighted. At least 2 probably were searching for fish concentrations to aid the fleets.

OFF CALIFORNIA

Soviet: During 2 surveillance flights, 6 vessels were sighted on April 3, about 16

miles off Farralon Islands; 13 vessels on April 19 off northern California. Estimated number of vessels off California during April was about one dozen. Most were stern factory trawlers.

Research Vessel Takes Supplies At Los Angeles: On April 18, the research vessel "Druzhnii" of Soviet Pacific Institute for Fisheries and Oceanography received permission to enter Los Angeles harbor (see fig. 1) to obtain 100 tons of drinking water and 140 tons of diesel oil. The vessel had departed Vladivostok on Feb. 25 and was headed for Central Equatorial Pacific to conduct oceanographic research.

IN GULF OF MEXICO AND OFF SOUTH ATLANTIC

No foreign vessels were sighted fishing off U. S. Atlantic coast south of Cape Hatteras (including off Florida) or off U. S. Gulf of Mexico coast.

IN NORTH ATLANTIC

An estimated 240 vessels--Soviet, Polish, East German, and Japanese--were sighted in North Atlantic off U. S. coast. This was 70 over the March 1968 number. Soviet vessels were most numerous; judging from weekly surveillance, Soviet fleet averaged an estimated 120.

Fig. 1 - On April 18, 1968, Soviet research vessel "Druzhnii" ("The Friendly One") enters Port of Los Angeles (San Pedro Bay) for fuel and provisions. (Photo: Putnam, Calif. State Fish and Game Commission.)

Aid to Soviet Fishermen: On April 26, 2 stern factory trawlers were granted permission to enter Drakes Bay. The "Revolutsioner" reported to U. S. Coast Guard that 2 crew members were injured and asked permission to enter U. S. territorial waters to rendezvous with "Tikhvin", which had a physician aboard. Later in day, the emergency medical evacuation of a seaman was requested. Diagnosis: compound fracture of nose.

In all, 188 individual Soviet vessels were sighted and identified; this compares with 125 in March 1968.

Thirty-seven Polish vessels, 5 East German side trawlers, and 2 Japanese stern trawlers also were sighted.

Widespread and frequent shifting of foreign fleets between Georges Bank and off U. S. mid-Atlantic necessitated coordination of

flights with First, Third, and Fifth Coast Guard Districts.

IN NORTHWEST ATLANTIC

Soviet: Early in April, about 30 Soviet vessels were dispersed along Continental Shelf from Block Island (R. I.) to Nantucket Island (Mass.). By mid-month, number declined briefly when fishing shifted to waters off New York and New Jersey. Later, about 70 returned and fished south of Nantucket and on south-west slopes of Georges Bank. The limited catches visible on deck appeared mostly herring, with some whiting and red hake.

OFF MID-ATLANTIC

Soviet: Through April, 100 or more vessels (mostly medium trawlers and support ships) fished primarily off New York and New Jersey and intermittently off Virginia Capes.

Early in month, about 75 vessels were 40-60 miles south of Moriches Inlet, L. I. Heavy-to-moderate catches observed were herring. By mid-month, an estimated 100 vessels were concentrated about 60 miles south of the Inlet. (See fig. 2.) Limited catches were primarily herring, but several stern trawlers appeared taking red hake. During first-half April, 25 to 30 vessels were off Virginia.

In last 10 days of April, frequent reports from U. S. fishermen at New York and New Bedford, Mass., indicated 50 to 60 vessels taking scup near Hudson Canyon south of Long Island. U. S. fishermen also reported taking in their trawl nets large amounts of scup and herring heads discarded by Soviet vessels processing the fish.

Polish: Early in April, about 20 vessels were 35 miles east of Barnegat Lightship off New Jersey. By mid-month, 30 vessels fished south of Long Island. Moderate catches of herring were seen.

East German: Four vessels arrived off southern New England and New York during second half of April. They were fishing for herring 17 to 23 miles south of Shinnecock Inlet (L. I.) and off Block Island (R. I.).

Japanese: Late in April, 2 stern trawlers were sighted near Hudson Canyon. The area has good whiting and red hake resources. Japanese sources report one trawler has taken about 200 tons, primarily butterfish, mixed with squid and other species. On April 30, one vessel was sighted 70 miles south of Block Island (R. I.). No catches were observed.

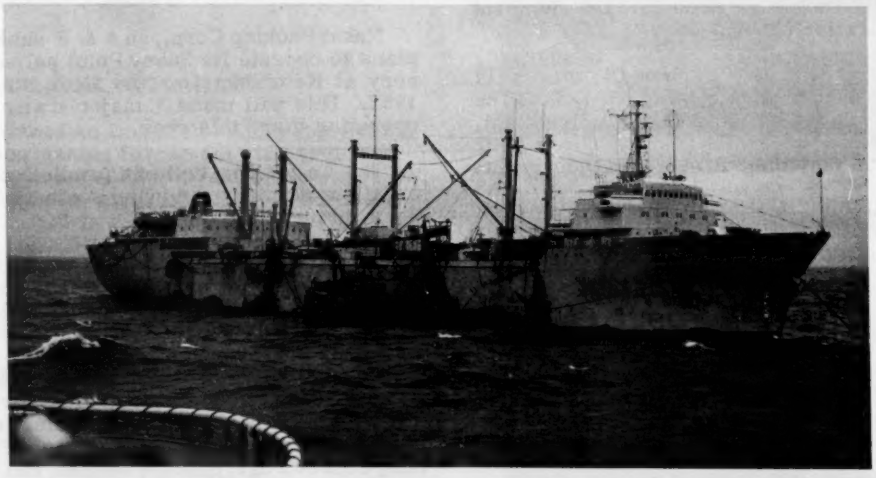


Fig. 2 - Soviet processing factoryship "Chernomorskaia Slava," built in W. Germany, receives catches from medium side trawler (SRT class) in Moriches Inlet loading and unloading zone. This is off Long Island, N.Y., and was established by 1967 U.S.-USSR Mid-Atlantic Fisheries Agreement. (Photo: USCG cutter "Tamaroa")

STATES

California

FIRST BASKING SHARK LIVER SENT TO JAPAN

The Japanese vessel "Montana Maru" carried the first shipment of basking shark liver from California to Japan for processing, reported BCF La Jolla in April.

The shipment consisted of 139 drums totaling 57,465 pounds of liver taken from about 60 sharks. Most sharks were taken near Santa Barbara by 5 vessels in 3 days. Two more vessels have entered the fishery; several more have shown interest.

The fleet was expected to move north to Monterey, where 1,000-1,500 sharks were seen repeatedly by an airplane pilot.

* * *

EDA HELPS CREATE FISHERY FACILITIES AT CRESCENT CITY

Two grants totaling $385,000 to help develop a waterfront industrial park--and create 345 jobs--at Crescent City, Calif., were approved by the Economic Development Administration (EDA).

The Crescent City Harbor District will develop a 4-acre park costing $594,000. The project includes building wharves, ice plant, and 2 seafood processing plants. The Harbor District is matching EDA's $297,000 grant.

A. Paladini, Inc., Del Norte Ice & Cold Storage Co., and Eureka Fisheries, Inc., will operate the plants under long-term leases. Paladini will provide 133 new jobs, Eureka 208, and Del Norte 4.

Sewer System

EDA also is granting $88,000 to Crescent City, which will match it, to help expand its sewer system to serve the industrial park. The system will serve the harbor area and adjacent parts of Del Norte County.

Development of the waterfront industrial park is part of city and county long-range efforts to strengthen the fishing industry and replace jobs lost by the closing of 2 lumber plants.

Alaska

STATE POLLUTION LAWS STRENGTHENED

BCF Juneau reports that Gov. Walter J. Hickel of Alaska signed legislation in April prohibiting pollution of State waters by petroleum, acid, coal, or oil tar, lamp black, analine, and bitumine.

The Act provides, on conviction, fines of $500 to $2,500 and imprisonment of 30 days to 1 year. Violators also may be held liable for civil damages of $5,000 to $100,000. If a vessel is involved, it can be seized without warrant and held as security for payment of civil damages.

* * *

SALMON CANNERY PLANS TO REOPEN

Nakat Packing Corp., an A & P subsidiary, plans to operate its Sunny Point salmon cannery at Ketchikan for the first time since 1952. This will make 3 major canneries operating there this year.

The decision reflects predictions of an excellent salmon year in the southern part of Southeastern Alaska.

* * *

FERRIES TO SERVE PRIME FRESH SEAFOODS

Alaska's finest seafoods will be delivered fresh to each ferry arriving at Petersburg. The suppliers will be: Alaska Glacier, shrimp and Dungeness crab; PFI, king crab; Petersburg Cold Storage, halibut, salmon, and sablefish (black cod). In all, 2,000 pounds will be provided to the Southeastern Alaska ferries each week.

This will be the first constant supply to the ferries. The fresh seafoods will be in insulated containers.

* * *

KODIAK WATER SHORTAGE EXPECTED

The recent expansion of shrimp production has made Kodiak officials uneasy about the municipal water supply. If present plans are fulfilled, there will be 20 to 24 shrimp peeling machines in operation by the end of 1968. This is more than a 100 percent increase in machines that use much water.

Water Needs Increasing

During the past year, Kodiak tripled its water supply. At present, it is enlarging its reservoir capacity. It was hoped the completed projects and those being built would meet industry needs for the next 3-5 years. However, fishery developments, especially in the shrimp industry, have created new water demands that must be met this year. At peak processing periods, Kodiak uses as much water as metropolitan Anchorage, a city 10 times larger.

Hawaii

SEEKS AIR LINK WITH ALASKA

The Hawaiian Legislature has approved a resolution asking for direct air service between Anchorage, Alaska, and Honolulu. The resolution was directed to the Civil Aeronautics Board in Washington, D. C.

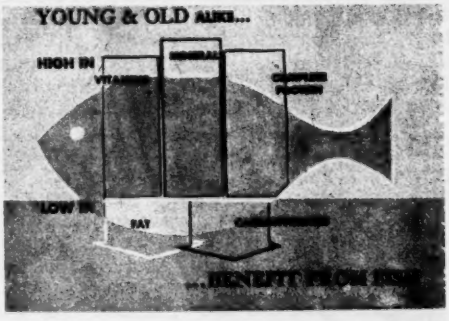
The legislature said Hawaii produces cattle and other commodities that are shipped to Alaska in large quantities. Alaska has large quantities of seafood that can be shipped to Hawaii. Also, the route would be a potential stimulant to the movement of commerce and people.

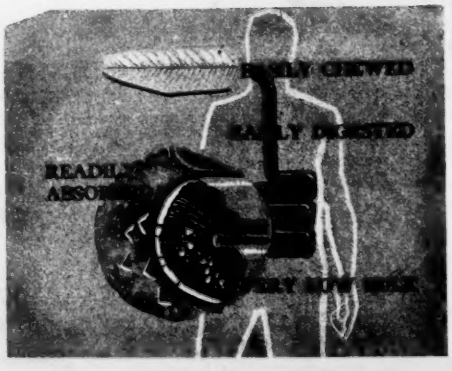
Florida

BANS SALES OF
CERTAIN PUBLIC LANDS

Florida has banned any more sales of public land in Boca Ciega Bay, Apalachicola Bay, Charlotte Harbor, Featherbed Bank, and Banana River. It has ordered a master plan for the "preservation and utilization of state submerged lands." An interagency committee was set up to develop a plan that would designate areas in a natural state to be set aside in perpetuity.

Research by BCF's Biological Laboratory in St. Petersburg Beach brought to public attention the effect of dredging and filling on the rich marine life of these areas.





BUREAU OF COMMERCIAL FISHERIES PROGRAMS

BCF's New Lobster Trap May Open Offshore Fishery

A new steel pot (trap) that can be used in offshore, deep-water, lobstering may lead to a new fishery for Gloucester, Mass., and other coastal fishing centers. It was developed by BCF's Exploratory Fishing and Gear Research Base in Gloucester. The new pot has excited fishermen.

At present, lobsters are caught inshore using wooden slat boxes with net openings--and offshore with trawls. A wooden box cannot be used in deep water because it floats. And the trawl often injures lobsters when catching them and again when it is raised to a vessel's deck. Massachusetts law forbids landing dead lobsters.

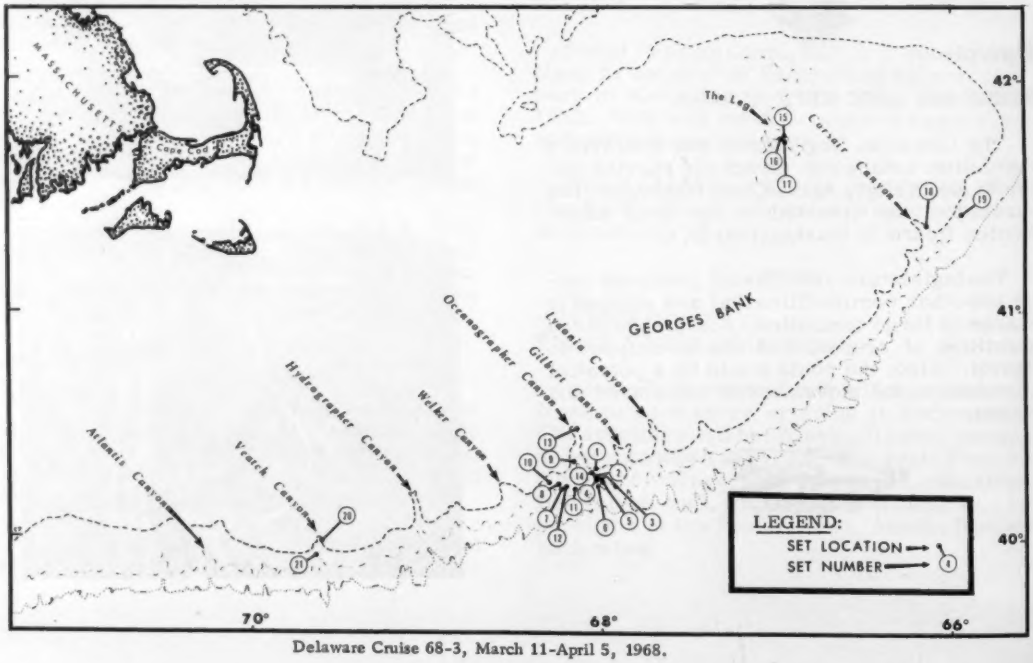
The wooden boxes are strung in strings of 4 to 6 on the sea bottom with a buoyed line. Most inshore lobstermen fish within 1-1½ miles off shore with lines 75-120 feet long. The average take is one pound per pot during the season's height.

The new plastic-covered steel pot, approximate inside dimensions 5x4x2 feet, weighs 138 pounds. It is more than twice as large as the inshore wooden box. Now the offshore pot fisherman will be able to string 30 to 100 steel pots per line 1,200 fathoms long. Pulled every 24 hours, the catch can be 20 pounds per pot. It is estimated that an average catch per pot of 10 pounds could make a profitable industry.

The Past 10 Years

During the past 10 years, an increasing number of vessels converted from fish dragging to lobster dragging because lobster was extremely valuable. In 1966, 25.6 million pounds of lobster were taken by inshore pots--and 3.9 million pounds by offshore dragging. Most of the catch was taken in New England waters. Preliminary 1967 figures indicated 5 million pounds taken by trawl, while the pot take fell below the 1966 figure. The catch value increased.

Following is the cruise report of BCF's exploratory vessel "Delaware," which tried the new pot. (Cruise 68-3, March 11-April 5, 1968.)



Delaware Cruise 68-3, March 11-April 5, 1968.

LOBSTER EXPLORATIONS ON THE CONTINENTAL SLOPE AND SHELF WITH POT (TRAP) FISHING GEAR

BCF's research vessel Delaware completed the first in a series of scheduled cruises to investigate pot (trap) fishing for lobsters on the Continental Shelf and Slope.

The cruises are to be conducted by BCF's Exploratory Fishing and Gear Research Base at Gloucester, Mass. They are part of the continuing program to aid the trawler fleet of the North Atlantic Region.

The pot fishing method, generally used only in near-shore depths, may provide members of the groundfishing and scalloping fleets with the possible means to profitably diversify their fishing effort. The development of an offshore pot fishery to harvest lobster populations from areas of rough, untrawlable bottom would benefit the industry. It would reduce the competition for--and the fishing pressure on--the currently producing fish stocks. Further, an increase in lobster production should stimulate an expansion in marketing to make better use of the potential U. S. market for live lobsters.

During Delaware's Cruise 68-3, exploratory activities were largely limited by the prior necessity to solve shipboard gear-handling problems and to work out practical techniques for fishing at considerable depths with offshore traps. However, limited explorations were accomplished. Twenty-one (21) sets of 11- to 19-pot strings of lobster pots were made. Of this number, 11 caught lobsters; one caught only red crabs; two caught only rock (sand) crabs; and four were without catch of commercial value. The gear was lost on three sets because of weather and the failure of a component of the running gear.

Fishing Results

The largest lobster catch weighed 150.5 pounds. This catch was taken on a 14-pot string that fished for 77 hours; weather conditions had not allowed the set to be hauled sooner. Excepting one $2\frac{1}{2}$-pound lobster, all were large. It seems significant that all lobsters were in the "parlor" (holding) section of the pots on this set. Because the bait was almost gone and the few remaining scraps were watersoaked, it was obvious that the pots had ceased to fish before the pots were hauled. Based on this very limited experience, it is anticipated that a fishing period of about 48 hours may produce the best results. This would depend on the concentration of lobsters available, water temperature with its consequent effect on keeping qualities of bait and the metabolic rate and rate of activity for lobsters, and the feeding behavior of the lobsters at the time.

Ninety-four (94) lobsters weighing about 389 pounds were taken during the cruise: 78 were legal size totalling about 380 pounds. The average weight was nearly 5 pounds. All except 2 of the 16 short lobsters were taken on one 11-pot string of gear set in Veatch Canyon in 140 to 150 fathoms.

Except for 4 males, the entire catch was either tagged and released near their point of capture, or were preserved for later biological study. The 4 males are being used initially in time-lapse motion picture studies of lobster behavior in relation to lobster pots. The same lobsters are destined for transfer to the State Lobster Hatchery at Martha's Vineyard, Mass., where they will be used in breeding experiments.

During 3 daytime sets--when pots were set and hauled during the day without an intervening period for nighttime lobster activity--only one lobster was caught. However, $1\frac{1}{2}$ bushels of rock crabs were taken in the second daytime set. Of 15 overnight sets, 10 produced lobsters; one produced a heavy catch of red crabs (800 pounds); one produced rock crabs and hake; and one caught cusk and codfish. The two remaining night sets caught nothing.

Two incidental catches of red crabs were made while exploring for lobsters. One (paragraph above) totaled 25 bushels of crabs from 13 pots weighing 800 pounds. The other was $6\frac{1}{2}$ bushels for 208 pounds from 11 pots; this string also caught one 3-pound lobster. It seems this species of crab can be readily taken by pot gear in depths and areas it occurs. It may prove to be a profitable adjunct to lobster pot-fishing.

The cruise was divided into two parts. Two different sets of running gear as well as lobster pots were used:

Running Gear in 1st Part

The running gear used during the first part was made of 7x19, $\frac{5}{16}$-inch diameter, double

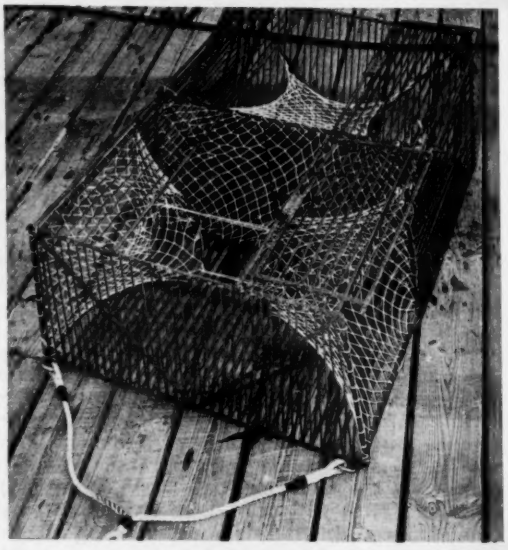
galvanized, aircraft-type wire rope. Its approximate (manufacturer's estimate) breaking strength was 9,800 pounds. This wire was used both for the buoy lines and the mainline to which the pots were attached. For ease in shortening or lengthening the buoy lines (according to length required for depths fished), the buoy lines were cut into 100-fathom sections. The mainline, between points of attachment for the pots, was assembled in 10-fathom lengths; this allowed mainline's length to be easily adjusted to accommodate number of pots desired on a string. All ends of the $\frac{5}{16}$-inch wire were swage-spliced with thimples included. Sections were joined with split-links, swivels, and "figure 8" links--the latter for quick disconnect or connection. In addition, linkage for connection of mainline sections also included another type of quick disconnect coupling for attachment of the pot gangions. For this purpose, a recessed link and "G" hook were used (similar to Vigneron-Dahl or "dandyline" otter-trawl gear). During preliminary test fishing, the recessed link was included in the mainline and the "G" hook was attached to the pot gangion. At the beginning of the cruise's first part, this order was reversed and the "G" hook was included in the mainline, while the recessed link was attached to the gangion. The change was made to help eliminate loss of pots due to accidental disconnection while fishing. Air-filled, plastic, balloon-type floats, of approximately 120 pounds of static lift each, were used to float the buoy lines; the number of floats used during each set was adjusted to the length and weight of the buoy line used for the varying depths fished.

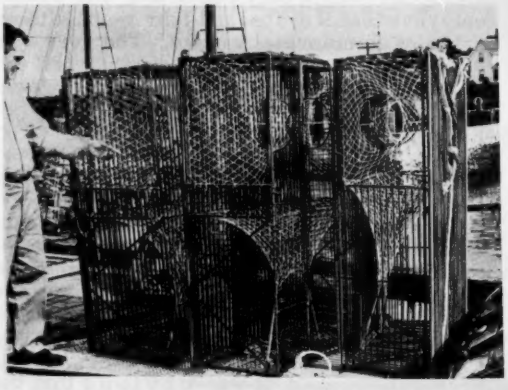
Running Gear During 2nd Part

During the second part, $\frac{1}{2}$-inch diameter, 6x19, galvanized wire rope with an approximate breaking strength of 23,000 pounds was used to replace the buoy lines fished during the first part. This $\frac{1}{2}$-inch buoy line was connected to $\frac{3}{4}$-inch diameter wire used for the mainline; the $\frac{3}{4}$-inch wire had an approximate breaking strength of 42,000 pounds. At one end of each mainline, an extra 300 fathoms of $\frac{3}{4}$-inch wire was included; this provided sufficient length to start wrapping the heavy wire on the winch before the pots were lifted from the bottom. Hardware in both the buoy line and the mainline was reduced to a few swivels attached with split-links and shackles to mechanically spliced eyes in the ends of the wire sections. The pots were attached to the mainline by means of 2 links of chain and shackles. One chain link was fixed to the $\frac{3}{4}$-inch mainline by means of a wire clamp, the other link was shackled to the eye in the end of the pot gangion. No pots attached in this fashion were lost. Each buoy line (made from the $\frac{1}{2}$-inch wire) was buoyed by a cluster of four 55-gallon drums filled with polyurethane foam. The statis lift of each cluster of drums was 1,600 pounds.

Pot Gear in First Part

Pot gear of a variety of designs was fished during the first part of the cruise. A total of 63 pots included 7 BCF-designed experimen-





Deepwater lobster pots (traps) fished during first part of Delaware Cruise 68-3.

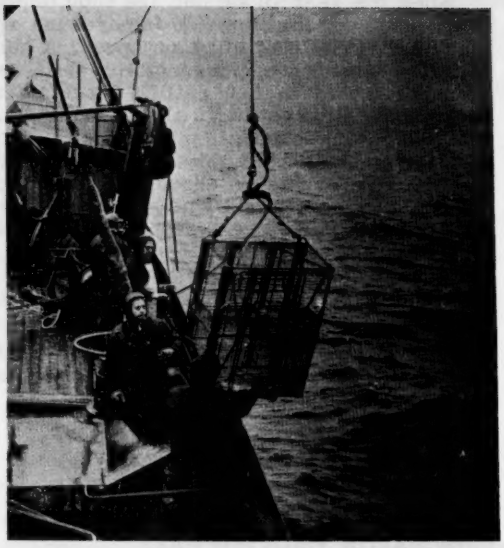
tal pots, 31 BCF-built pots modeled after one of 11 original prototype pots of experimental design, and 25 plastic-coated pots built by a cooperating manufacturer but modeled after one of the larger BCF experimental designs. One string of 15 pots was lost when carried downslope during an extended period of bad weather, 8 single pots were lost while perfecting fishing and gear-handling techniques, and 33 were lost when the swage splices weakened during use and parted. To date, grappling operations have been unsuccessful in retrieving the lost gear, but continued efforts are planned for later in the year.

Pot Gear in Second Part

Fewer pots were fished during the second part of the cruise. Twenty-five (25) steel-framed, plastic-coated pots were available aboard ship; these included (1) five of 40x60x18-inch dimensions, and (2) twenty of 36x48x18-inch dimensions. Of the latter, 6 were equipped with plastic-coated wire "kitchen heads" (entrance tunnels); all other pots had twine-knitted kitchen heads. All pots had twine parlor heads. Three uncoated steel pots of varying dimensions were also available; however, only 2 strings of 11 plastic-coated pots each were fished during the 13 sets made on this part of the cruise. No gear loss or damage was sustained.

Shipboard Gear Handling

The system for handling the lobster pot gear aboard ship has passed through successive steps leading toward the best method; this process continues. The primary requirement is that it should be rugged yet rapid, safe, and easy to operate; further, it should be relatively simple and inexpensive to instal. Obviously, the method should contribute to damage-free handling of the pots. A problem that sounds simple--but is difficult to solve--is that the pots frequently come up between the vessel hull and the mainline during haulback. When the pots are lifted to rail height, they become jammed between mainline and ship and tend to be crushed by the pressure exerted. To eliminate this requires major modification of an otherwise straightforward system. Besides reducing time and manpower requirements for handling gear, it is hoped existing deck or gear machinery can be used, or modified, to curtail conversion costs.



Taking lobster pot aboard ship during haulback operation.

The Delaware's system is considered far from ideal. However, it represents one practical solution; although relatively slow and primitive, it is nevertheless quite safe, does not incur damage to or loss of pot gear, uses existing deck machinery, is inexpensive to instal, and is fairly easy to operate. The trawl winches are used to take up and store the buoy lines and mainlines. The lines are hauled over existing deck-mounted sheaves with their fairlead to (and from) the forward starboard gallows and the hanging sheave for that gallows. The gear is both hauled and set in this manner.

During hauling, the buoy line flotation is brought aboard, and the end of the buoy line is shackled to a pennant reaching to the winch drum. The buoy line is taken in by the winch. When the mainline is reached, the first pot is lifted (by the gangion attached to the mainline) from the water. The gilson hook is used to catch the bridle, which attaches the gangion to the pot; after the gangion is unshackled from the mainline, the pot is lifted over the rail with the gilson and dropped upon a table set on the deck. From the table, the pot is slid along a skid (made of pipe) to a rack installed along the starboard rail. The pots remain in this rack where they are emptied, rebaited, and stored until the next set is made.

When the gear is set out, the buoy is put overboard, and the buoy line is payed out as the vessel proceeds at slow speed. When mainline is reached, the gangion of the forward pot (in rack along rail) is shackled to mainline, and the pot is pushed overboard. The next pot in the rack is pushed forward to a point where the pot gangion will reach to the mainline paying out through the hanging sheave in the gallows. This process is repeated until all pots are overboard. The end buoy line is payed out and the buoys are set. All gear is set "on the fly" because otherwise the pots tend to fall to the bottom in a heap--and an appalling snarl results.

More offshore lobster-trapping trials and exploratory fishing are scheduled for June 1968.

Search for Hake

1. THE 'BARON' FINDS FEW HAKE

The BCF-chartered M/V Baron returned to Seattle, Wash., on April 24 after 75 days of experimental gear research (Cruise No. 10). The research concerns development of commercial harvest systems for Pacific hake (Merluccius productus). The areas of operation were off northern Mexico, California, and Oregon. The Baron was assisted by BCF's "John N. Cobb" and "Miller Freeman" in the first 2 areas. She found insufficient hake to warrant a commercial fishery during late winter-early spring. Some immature hake (5 to 13 inches) were found in Santa Barbara Channel and near Point Conception.

Objectives

The major objective was to sample schools of spawning hake to determine the best method and time to make good catches. Other objectives were to: (1) delineate the geographic and bathymetric distribution of hake schools; (2) survey hake schools to determine diel changes and their position in the water column and daily direction of movement, (3) fish at various levels through hake schools during daylight and darkness to establish catch rates and obtain data on school composition; (4) conduct behavior and stratification studies utilizing a remote-controlled underwater strobe camera; (5) provide samples of hake for tests by interested processors in the California area.

Methods of Operation

The cruise schedule was phased in the order of objectives. Sonar and depth sounders were used while attempting to locate schools. Tracklines generally extended 15 to 60 miles off shore, and occasionally to 100 miles.

Vessel and Equipment

The Baron is a 4-man, 96-foot, seiner-dragger-type vessel, powered by a 510 hp. diesel. Pilothouse equipment includes 2 lorans, 2 radars, depth sounder, sonar, and ship-to-shore radio. Deck machinery includes hydraulically operated separate drum trawl winches, net reel, and dual hoists. The Baron can carry about 100 tons of hake.

Gear

The Baron carried "Cobb" pelagic trawls, Universal trawls and aluminum hydrofoil-type otter doors, dual electrical core towing cables.

Weather

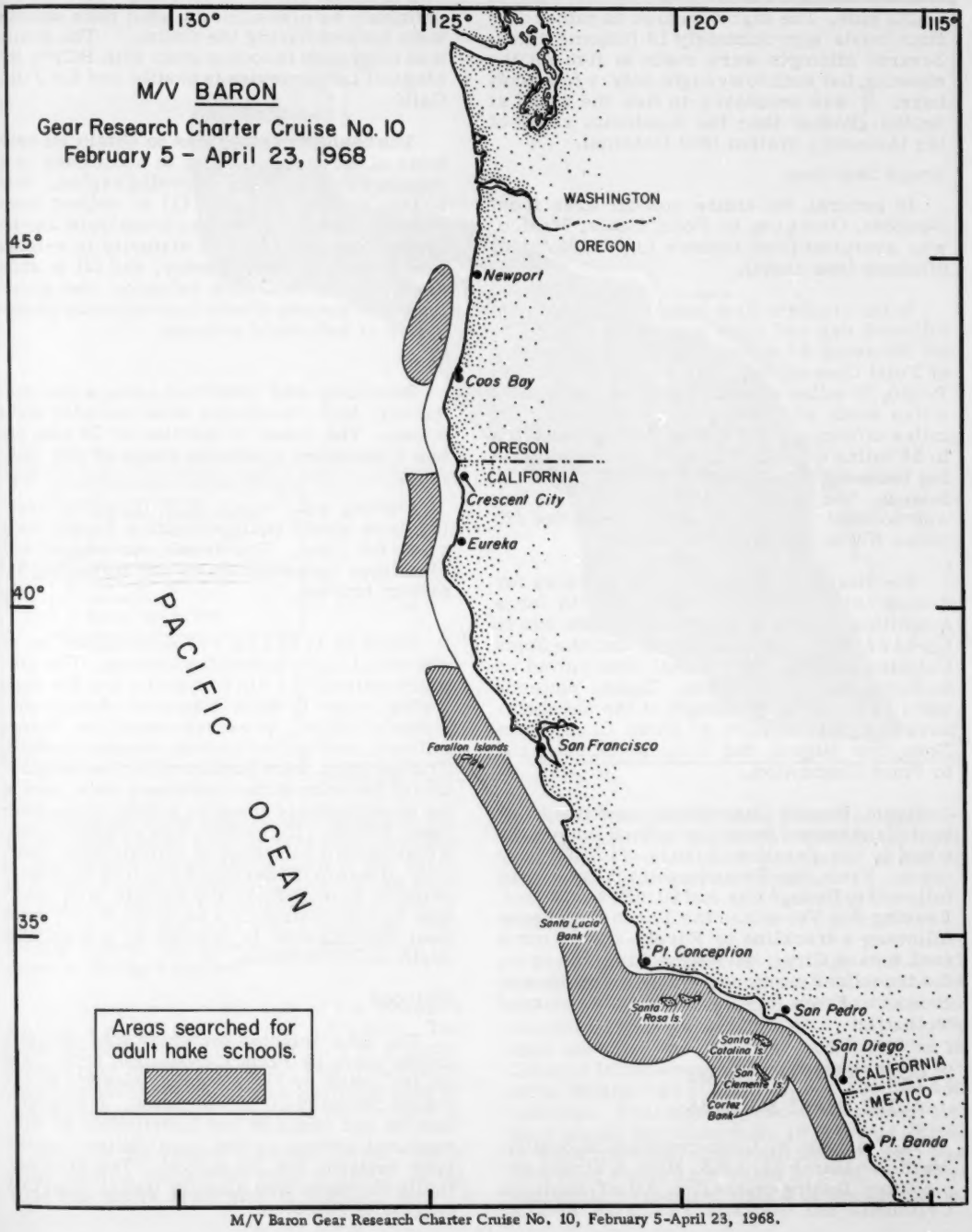
The weather was excellent during the first half; during much of the second half, strong northwesterly winds and rough seas caused some difficulty in searching for schools.

RESULTS

The Baron was unable to locate schools of fish.

On previous cruises adjacent to northern Mexico and southern California, schools of spawning hake had been found. However, no studies had been conducted to determine the feasibility of a commercial fishery in that area. During the Baron's Cruise No. 10, the John N. Cobb and the Miller Freeman were conducting resource assessment and biological studies of hake. They helped the Baron search for adult hake schools.

Although no sizable schools of spawning hake were located, echo-sound tracings showed one promising sign in 225 fathoms 25 miles northwest of San Clemente Island. The traces had the characteristics generally associated with hake schools; they were



M/V Baron Gear Research Charter Cruise No. 10, February 5-April 23, 1968.

tracked over an area 6 miles long and several miles wide. The sign appeared as rather distinct bands approximately 10 fathoms thick. Several attempts were made to fish on the showing, but each tow caught only a few adult hake. It was necessary to fish the trawl at depths greater than the maximum range of the telemetry system (200 fathoms).

Areas Searched

In general, the entire coastal area from Newport, Oregon, to Point Banda, Mexico, was searched from inshore to 60-100 miles offshore (see chart).

In the cruise's first half, tracklines were followed day and night moving southward to off Monterey 60 miles, then south from west of Point Conception to San Pedro. From San Pedro, 20 miles offshore, southeasterly to 75 miles south of the Mexican border and 40 miles offshore. The Baron then turned west to 65 miles offshore, then on a course heading between San Clemente and San Nicholas Islands. The single promising echo sounding was located on this leg of the trackline (25 miles NW of San Clemente Island).

The Baron fished on the heavy traces for 3 days but was unable to take hake in large quantities. Tracklines were then run to Cortez Bank, San Clemente, and the Santa Catalina Islands. The vessel then moved up to Santa Barbara Channel. Zigzag patterns were followed the length of the channel--covering from inshore to Santa Cruz, Santa Rosa, San Miguel, San Nicholas Islands, and to Point Conception.

From Point Conception, tracklines extended out beyond Santa Lucia Bank and up the coast to the Farallon Islands off San Francisco. From San Francisco tracklines were followed to Bodega Bay and 80 miles offshore. Leaving San Francisco the Baron then began following a trackline to Eureka and on north to Crescent City. After searching this area, the tracklines continued to Coos Bay then to Newport. From Newport the Baron returned to Seattle.

2. 'COBB' FINDS NO LARGE ADULT HAKE SCHOOLS

BCF's John N. Cobb returned to Seattle, Wash., on March 22, 1968, after a 40-day exploratory fishing cruise (No. 93) off southern California and the Baja Peninsula, Mexico. "No concentrations of fish sign that could definitely be classified as adult hake schools were located during the cruise." The cruise was conducted in cooperation with BCF's Biological Laboratories in Seattle and La Jolla, Calif.

The basic objective was to obtain an estimate of the standing stock of adult hake in a selected portion of the spawning region. Secondary objectives were: (1) to collect samples of hake for stomach analysis and for studies of size, sex, and maturity in relation to distribution and behavior; and (2) to study the diel and schooling behavior and short-term movements of hake by continuous observation of individual schools.

Gear

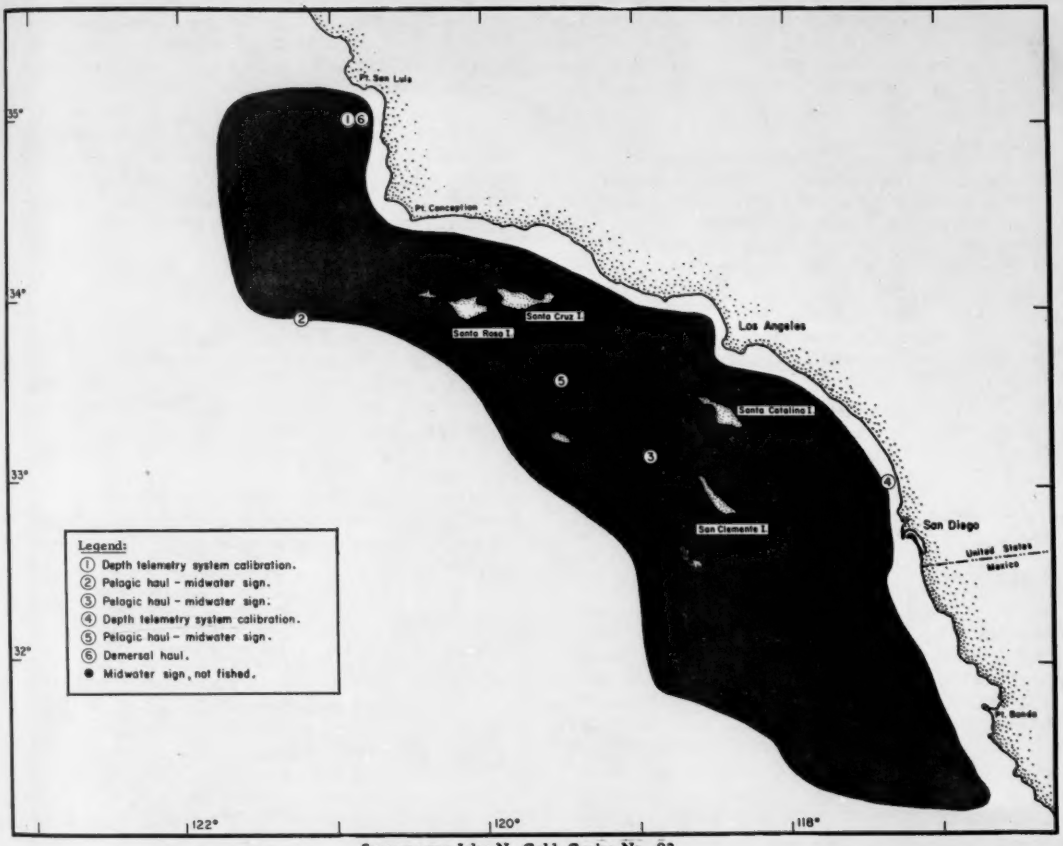
Searching was conducted using a low-frequency, high-resolution echo sounder and a sonar. The sonar transmits at 30 kHz and has a specified maximum range of 800 fathoms.

Fishing gear was a BCF Universal trawl ($2\frac{1}{2}$-inch mesh) equipped with a $\frac{1}{2}$-inch mesh codend liner. The trawl was rigged with aluminum hydrofoil doors and three-leg 30-fathom bridles.

Depth of fishing was determined by an electrical depth telemetry system. The system's principal components are the main towing warps ($\frac{5}{8}$-inch diameter electro-mechanical cable), pressure-sensitive transmitters, and pilothouse readout meters. Transmitters were positioned at the termination of the warp at the starboard door, and at the termination of the port bridle to the footrope Initially, the system was calibrated for a maximum depth range of 200 fathoms. However, it was found necessary to fish at greater depths--so one side of the system was modified by installation of a variable resistor and than recalibrated to operate at a maximum depth of 300 fathoms.

Methods

The area selected for study was bounded on the north by Point Conception, Calif., and on the south by Point Banda, Mexico; it extended seaward 60 to 100 miles. It was chosen on the basis of the distribution of hake eggs and larvae, vessel capabilities, and the time available for the survey. The area actually surveyed was slightly larger than that originally selected.



Survey area John N. Cobb Cruise No. 93.

During the first half of the cruise, the survey was run in a north-to-south direction on tracklines run perpendicular to the coast at 20- to 25-mile intervals. During the second half, the survey took place in the opposite direction on tracklines which were not uniformly spaced and generally intersected the coast at oblique angles.

Searching was conducted at the vessel's normal cruising speed of 9.3 knots. The echo sounder was set to record to a maximum depth of 275 fathoms. The tilted (wide angle) beam of the sonar was used because of the depth limitations of horizontal scanning.

Usually the vessel operated on the tracklines during the period 0600 to 2000. Little time was spent searching at night.

Trawl hauls were made whenever significant fish sign was detected. Specimens from each haul were either processed at sea or frozen for laboratory analysis.

Results

No concentrations of fish sign that could definitely be classified as adult hake schools were located. Midwater sign having some characteristics generally associated with hake schools was observed at 4 locations in Channel Island area. All of the sign was located during daylight between 195 and 250 fathoms. The sign appeared as rather distinct bands approximately 10 fathoms thick. In each instance, the main body of sign was less than 4 square miles in area. A trawl haul could be made at only 3 of the locations.

Small amounts of adult hake (less than 100 lbs./hr. towed) and a minor catch of miscellaneous species were taken in two of the hauls. The catch in the third haul ($\frac{1}{2}$ hour) was 5 pounds of fish, jellyfish, and pelagic shrimp.

During the 2 hauls in which hake were caught, it was necessary to fish the net at depths greater than the maximum range of the telemetry system. Consequently, it is especially difficult to determine the reliability of the catches as measures of species composition and abundance. However, the echogram records from these locations, and from the other sites where "hake-like" sign was observed, indicate that significant densities of fish were not observed. In each case, a relatively minor reduction in volume setting on the sounder resulted in complete disappearance of the sign. The echograms, together with the results of trawling, suggest that the sign represented an assemblage of macroplankton mixed with small quantities of fish.

Juvenile hake ($\leq$ 3 years of age) were captured in inshore areas during 2 occasions when the depth telemetry system was calibrated. The calibration procedure involves lowering the trawl to the bottom and adjusting the system while the vessel drifts. Also, one bottom haul was made at 52 fathoms depth off San Luis Obispo Bay; a variety of demersal species, but no hake, were caught.

The Cobb devoted nearly all its effort to searching for hake. Very little time was spent observing the behavior of the concentrations of sign observed. This was carried out by BCF's "Miller Freeman" and the BCF-chartered "Baron."

Meaning of Cruise Results

The results of this survey parallel those of similar surveys in 1963, 1964, 1965, and 1966. Again, despite relatively widespread occurrence of hake eggs and larvae in the area of operation, which is indicative of a large spawning population, significant quantities of adult fish could not be located. To date, only one large concentration of hake has been observed. The following might be a few possible reasons for the observed results: (1) in all years, searching was restricted to a maximum depth of 275 fathoms, (2) the coverage and timing of the surveys did not coincide adequately with the geographic and temporal distribution of the spawning hake, and (3) hake infrequently aggregate in large schools for spawning.

Although the possibility exists, it appears unlikely that a significant amount of spawning would take place at depths greater than 275 fathoms. Spawning at these depths is certainly rare, if not unknown, among hakes and Gadoid fishes. Also, there is a variety of biological arguments against successful spawning occurring at these depths.

It has not always been possible to schedule surveys to cover spawning areas during periods of peak activity. But it appears that the timing and areal coverage of the surveys has been adequate to insure a high probability of at least occasionally detecting large spawning aggregations if they existed. In this regard, however, it should be noted that coverage of the offshore portion of the spawning region--those waters 100 to 200 miles from the coast--has been relatively restricted.

Large Schools Not Common

The results of the surveys indicate that hake do not often gather in large schools--greater than 10-15 square miles in area--and that spawning schools do not maintain themselves for long periods of time. This is contrary to what the scientists of the BCF Seattle Exploratory Fishing and Gear Research Base expected based on their knowledge of hake spawning in Puget Sound. The one spawning population observed there is densely massed in a 12- to 15-square mile area; spawning takes place over several months. School size apparently is maintained by more or less continuous emigration and recruitment. If, when spawning, the ocean hake population segregates into small scattered schools which are maintained for relatively brief periods, survey observations are more explicable than if it is assumed spawning behavior is such that large, dense concentrations are formed. However, regardless of the hake's spawning distribution and behavior, it is difficult to account for the results of the 1968 survey. During this survey, 3 vessels searched intensively a significant portion of the spawning region without success. The scientists conclude: "It is apparent that a de-

tailed review of all past survey data is necessary before further attempts are made to assess the abundance and availability of spawning adult hake."

For further information contact: Dayton L. Alverson, Base Director, Exploratory Fishing and Gear Research Base, 2725 Montlake Boulevard East, Seattle, Wash. 98102.

'Oregon' Dredges Callico Scallops Off Georgia and Florida

BCF's R/V Oregon returned to St. Simons Island, Georgia, on April 27 after 16 days of scallop explorations off the east coasts of Georgia and Florida (Cruise 128). This was the sixth in a series of industrial development cruises to keep an up-to-date check on the Florida east coast grounds. Previous explorations showed these grounds hold the greatest potential for commercial utilization of calico scallops (Pecten gibbus).

Primary Objective

The primary objective of cruise 128 was to continue dredging operations, emphasizing the area from southern Georgia to Cape Kennedy. Between Doboy Sound, Georgia, and Melbourne, Florida, 210 dredging stations were occupied in the $5\frac{1}{2}$- to 40-fathom range. Of these, 8-foot tumbler dredges fitted with 2-inch bag rings 20-rings deep were fished at 178 stations; 6-foot tumbler dredges fitted with 2-inch bag rings 13-rings deep were fished at 31 stations. All dredges were fitted with $2\frac{1}{2}$-inch stretched mesh nylon liners.

Four standard assessment transects were conducted from 10 to 40 fathoms in areas established during September 1967 (Cruise 121) and occupied during each cruise in the series.

East of New Smyrna Beach, in 23 to 28 fathoms, maximum catches ranged up to 20 bushels of scallops per 30-minute drag. Counts ranged from 92 to 133 meats per pound and yielded 3 to 3.6 pounds per bushel.

Catch Rates Significant

Northeast of Cape Kennedy, between latitudes 28°30' N. and 29°00' N., where commercial concentrations were located during February 1968, catch rates remained commercially significant. They ranged up to 18.9 bushels per 30-minute drag in 24 to 26 fathoms. Counts ranged from 93 to 101 meats per pound and yielded 3 to 4 pounds per bushel.

In the southern portion of the area surveyed, east of Cocoa Beach, catches ranged up to 14.7 bushels per 30-minute drag in 21 to 26 fathoms. Counts ranged from 97 to 151 meats per pound and yielded 2.2 to 3.8 pounds per bushel.

Subcommercial-size scallops were caught on the northernmost transect (southeast of Flagler Beach). Although scallops were smaller than those further south, the meats were firm and yielded 5.3 pounds per bushel. Counts ranged from 116 to 130 meats per pound. (See page 32 for chart.)

In general, meat counts were higher and meat yields lower, although commercially acceptable, than at other times during the current series.

Two days of dredging demonstrations were conducted for industry observers. Fishing information and assistance were provided to 3 vessels in the scallop fishery.

'Oregon' Surveys Midwater Schoolfish Off East Coast

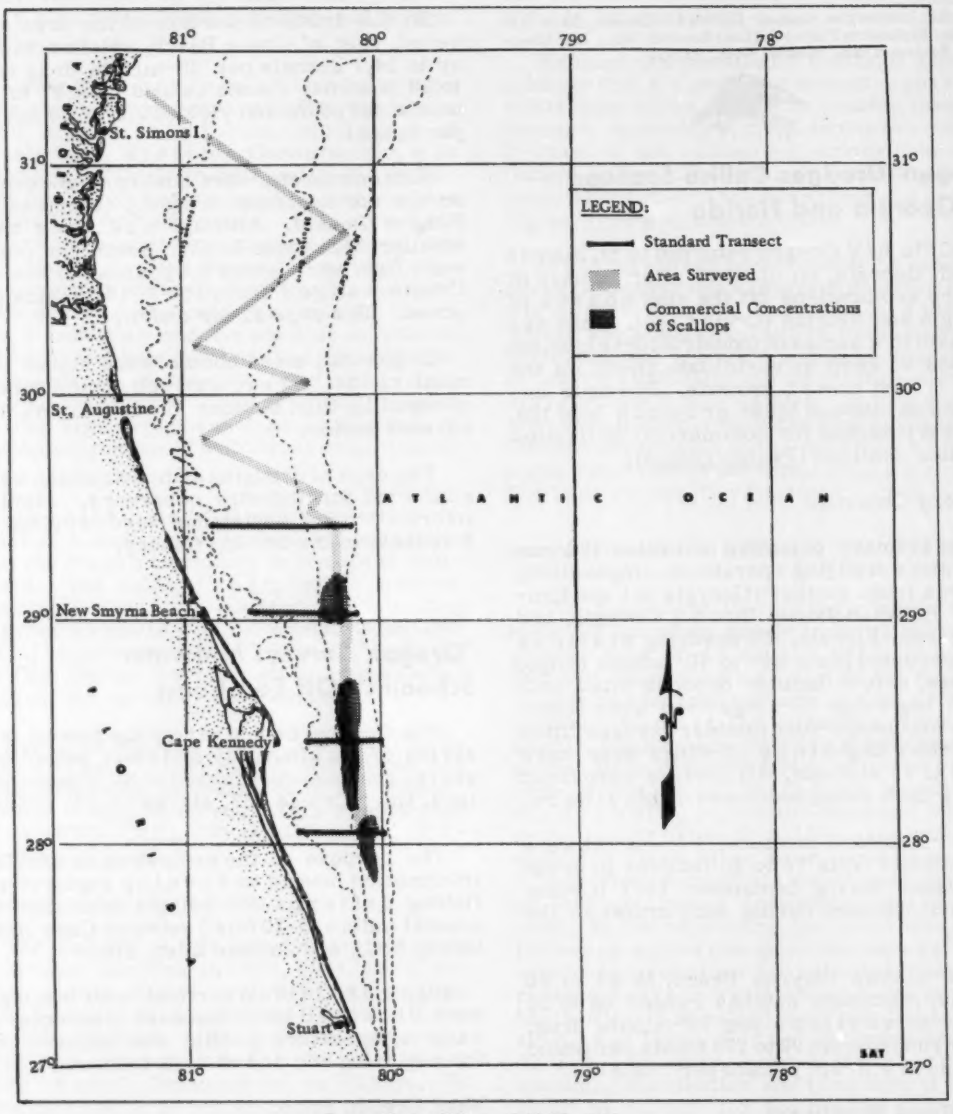
The Oregon completed the second in a series of six bimonthly midwater schoolfish survey cruises and returned to St. Simons Island, Ga. (Cruise 127, March 12-21, 1968.)

The purpose of the cruises is to provide information needed to develop exploratory fishing patterns for pelagic schoolfish in coastal waters (5-20 fms.) between Cape Hatteras, N.C., and Jupiter Inlet, Fla.

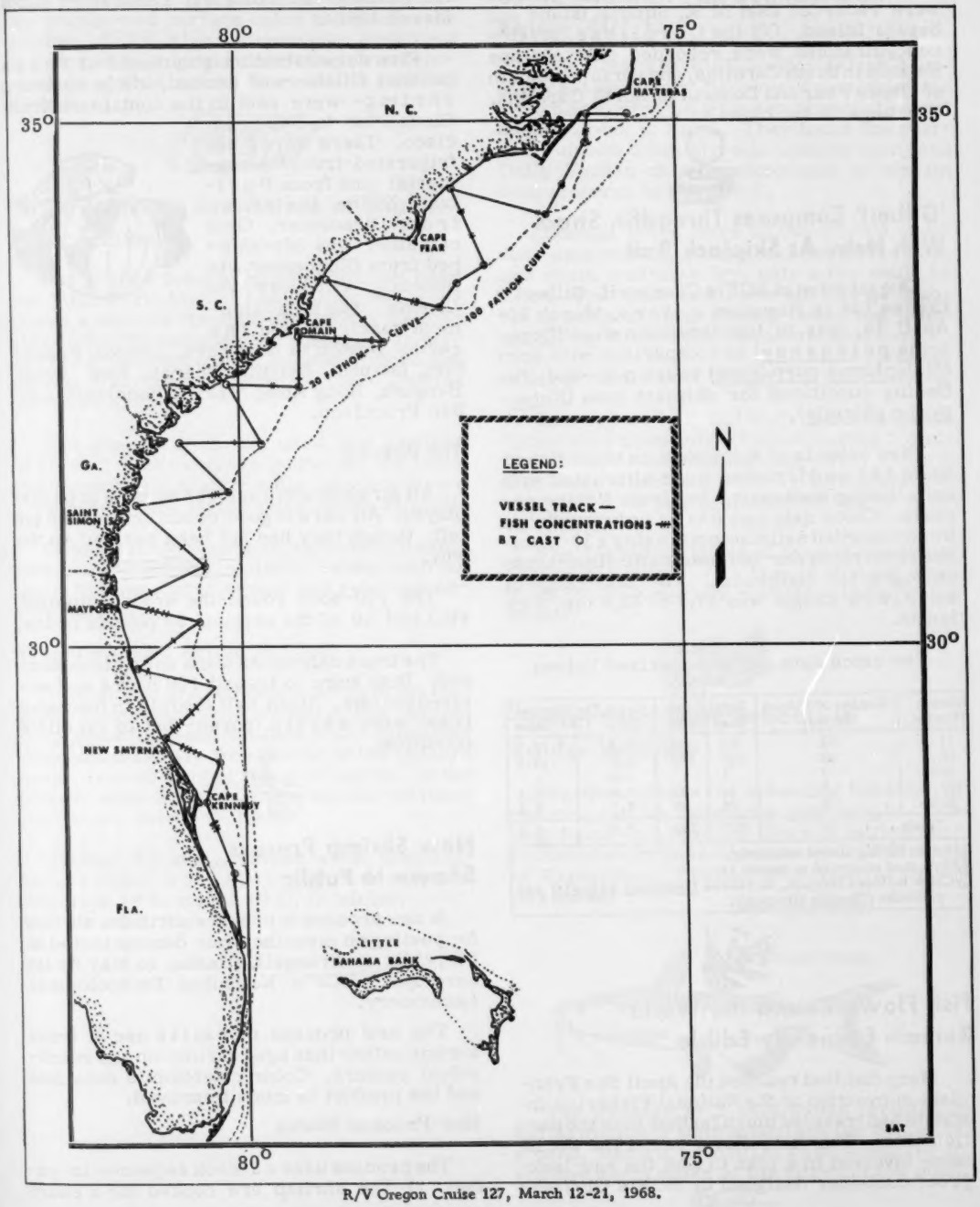
High resolution vertical echo tracings were obtained on 26 standard transects. A water-temperature profile was acquired at the beginning and end of each transect.

What Oregon Found

Preliminary examination of echo-tracing data shows that extensive concentrations of bottom and midwater fish schools again were present off Florida (north and south of New Smyrna Beach and southeast of Mayport).



Oregon Cruise 128, April 12-27, 1968.



R/V Oregon Cruise 127, March 12-21, 1968.

Off Georgia, limited midwater fish schools were recorded east of St. Simons Island and Sapelo Island. Off the Carolinas, sizable concentrations were recorded east of Cape Romain in South Carolina, and north and south of Capes Fear and Lookout in North Carolina. (See page 33 for chart.)

'Gilbert' Compares Threadfin Shad With Nehu As Skipjack Bait

One mission of BCF's Charles H. Gilbert's Cruise 108 in Hawaiian waters, March 20-April 18, was to test threadfin shad (Dorosoma petenense) in comparison with nehu (Stolephorus purpureus) under pole-and-line fishing conditions for skipjack tuna (Katsuwonus pelamis).

Five schools of skipjack tuna were fished while threadfin shad were alternated with nehu during successive 3-minute fishing periods. Catch data and skipjack abundance were recorded satisfactorily using a 20-channel event recorder and automatic time-lapse photographic equipment. The size range of skipjack caught was 37.7 to 62.6 cm. fork length.

The catch data are summarized below:

Station Number	Number of Fishing Periods	Total Catch		Catch Per Minute[1]	
		Shad	Nehu	Shad	Nehu
11	12	191	168	10.8	9.3
12	18	435	383	16.6	14.4
14[2]	1	2	-	0.6	-
15	7	31	92	3.5	7.5
20[3]	8	78	97	7.1	8.1
Totals		737	740	7.7	9.8

1/4 men fishing almost constantly.
2/Only shad chummed at station 14.
3/Catch included skipjack, kawakawa (Euthynnus affinis) and yellowfin (Thunnus albacares).

Fish Flown Round the World Remain Eminently Edible

Many fish that reached the April San Francisco convention of the National Fisheries Institute had traveled much farther than the participants. The fish, flown round the world, were involved in a plan to test the new leakproof container designed by BCF's Gloucester (Mass.) Technological Laboratory (CFR March 1968).

Five demonstration shipments of fresh haddock fillets--and cooked, whole northern shrimp--were sent in the containers from Gloucester to San Francisco. There were 2 refrigerated-truck shipments: one from Portland, Maine, the other from Gloucester. One container was air-shipped from Gloucester via Honolulu, another via London. The fifth shipment nearly circled the earth: Boston to New York, London, Frankfurt, Istanbul, Beirut, Teheran, New Delhi, Bangkok, Hong Kong, Tokyo, Honolulu--and San Francisco.

The Results

All air shipments arrived in time to be displayed. All were in good condition and had ice left, though they had not been re-iced on the way.

The 100-hour round-the world shipment still had 10 of the original 39 pounds of ice.

The truck shipments were not a close second. Both were in transit 150 hours and arrived too late. About half the fish in insulated boxes were partly frozen--but in excellent condition.

New Shrimp Process Shown to Public

A new process to prepare northern shrimp for peeling on machines was demonstrated to the public at Wrangell, Alaska, in May by its developer--BCF's Ketchikan Technological Laboratory.

The new process permits use of fresh shrimp rather than aged shrimp on the mechanical peelers. Color retention is excellent and the product is much improved.

How Process Works

The process uses a 2-cook sequence in water: 1) The shrimp are cooked for a short

time at a high temperature. This stabilizes the orange-red surface color and preserves quality. 2) The high-temperature treatment is followed by a longer cook at a lower temperature. This makes it easier to peel the shrimp.

Larger Lobsters Are Active at Night, Study Shows

The SCUBA team of BCF's Boothbay Harbor (Maine) Biological Laboratory has completed a study of the night behavior of the lobster during the summer and winter. The divers observed and counted lobsters inside and outside their burros from sunset to sunrise and down to 70 feet.

The observations indicated that lobsters of about 2-inch carapace length did not leave their burrows at night--while lobsters over 2-inch carapace length were active at night.

Of these larger lobsters, about 80% in summer--and about 40% in winter--ventured from their burrows after sunset and returned before sunrise.

Predators Also Active At Night

Finfish that are known predators of the lobster--longhorn sculpin, cunners, sea ravens, cod, goosefish, and wolffish--are relatively common and active inhabitants of the inshore ocean bottom during summer nights. In the winter, only a few inactive species of these finfish are seen.

During the study, bottom water temperatures ranged from 14° to 16° C. in summer and from 1° to minus 1° C. in winter.

Some Alaskan Fish Semidormant Below 40° F.

Biologists of BCF's Auke Bay (Alaska) Biological Laboratory discovered something interesting during underwater observations of Sashin Creek in April. They found the resident rainbow trout, juvenile coho salmon, and Dolly Varden char semidormant at stream temperatures below 40° F.

Although there were 20,000-25,000 resident salmonids in the creek, excluding pink and chum salmon fry, only a few could be found. The fishes found beneath large rubble in pools or deep stream areas were torpid. They made no effort to escape.

Different from 1967 Survey

The behavior and distribution of these fishes were markedly different during a similar underwater survey in June 1967. Then, they were distributed widely throughout Sashin Creek and segregated according to ecologic conditions in the stream.

The biologists planned to make frequent underwater surveys in May to find out when these fishes resume normal activity in the stream.

Catfish Form Tight Schools in Colder Weather

Weather affects the schooling behavior of channel catfish (Ictalurus punctatus). This was found in a study of marked catfish conducted in experimental ponds by BCF Branch of Exploratory Fishing personnel at Kelso, Arkansas.

Channel Catfish

The passage of 2 cold fronts resulted in the formation of tight schools in the center of a pond. Before, the catfish were scattered in shallow warm water at the edges of the pond.

ARTICLES

THE NEW THREAD HERRING FISHERY IN EASTERN GULF OF MEXICO

By Charles M. Fuss, Jr.*

The Atlantic thread herring, Opisthonema oglinum (Le Sueur), is a marine fish of the family Clupeidae that ranges from the Gulf of Maine to Brazil and throughout the Gulf of Mexico (Butler, 1961; Berry and Barrett, 1963). Thread herring seldom exceed 10 inches and are characterized by a thread-like elongation of the last ray of the dorsal fin (fig. 1). This characteristic led to the name "hairy back" frequently used by commercial fishermen.

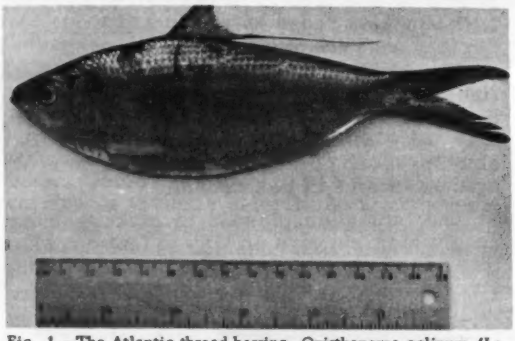


Fig. 1 - The Atlantic thread herring, Opisthonema oglinum (Le Sueur).

Thread herring occur in great numbers on the west coast of Florida, particularly between Tampa Bay and the Florida Keys. They are frequently concentrated in nearshore waters, generally inside the 10-fathom contour. The earliest report on the extent of thread herring schools in the eastern Gulf resulted from tuna bait explorations by the Bureau of Commercial Fisheries' "Oregon" in 1953 (Butler, 1961). In 1967, Bullis and Thompson--on the basis of aerial and surface surveys by BCF's Exploratory Fishing and Gear Research Base, Pascagoula, Miss.--estimated that the Gulf stock is about 1 million tons. The size and significance of the resource have been further confirmed by aerial surveys of the St. Petersburg Beach Laboratory and by commercial exploratory fishing (Sykes, 1967).

THE DEVELOPING FISHERY

In 1961, Butler described the early (1953-60) developments of the fishery on the Florida Gulf coast. The industrial fishery began in the St. Petersburg area during winter 1958-59, when catches up to 27 tons per set were made with lampara seines. Single-boat purse seining, introduced in winter 1959-60, produced catches of 5 to 40 tons per set. The fish were transported to pet food and reduction plants in the northern Gulf of Mexico because landing facilities were not available on the lower west coast. Adverse weather during the winter, and a shortage of freight vessels to transport the catch, further limited development of the fishery.

In 1957, a small bait fishery for thread herring and other clupeoids was started in St. Petersburg by one vessel equipped with a lampara seine. Single-boat purse seining began in 1958. Fishing has continued intermittently since then, and a converted menhaden vessel was added in 1967. The same vessels are used for taking food fish in offshore waters.

Predictions of a continuing decline in Atlantic menhaden stocks (Henry, 1966) and the promising results of Gulf thread herring surveys generated intense commercial interest in the further development of an industrial thread herring fishery on the Florida west coast in early 1966. In August 1967, a reduction plant (fish meal, oil, and solubles) was opened on Charlotte Harbor in the Fort Myers area. Initially, the plant was supplied by one vessel fishing a single-boat purse-seine rig (fig. 2); a typical menhaden vessel (2-boat rig) joined the operation in October. Landings at the plant by the end of December totaled about 3,750 tons1/ of thread herring.

In November, Louisiana-based menhaden vessels (fig. 3) entered the fishery off Fort Myers. One of these vessels made a record

*Fishery Biologist (Research), BCF Biological Laboratory, St. Petersburg Beach, Florida 33706

1/Unpublished BCF statistical data.

Note: Contribution No. 44.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 816

catch of 500 tons in 5 hours. Landings in Louisiana by the end of December were about 1,150 tons[1/]. These catches, plus the Florida landings, totaled almost 5,000 tons during September-December.

Fishing has been restricted to a relatively small area off Fort Myers in nearshore waters about 3 to 10 fathoms deep (fig. 4).

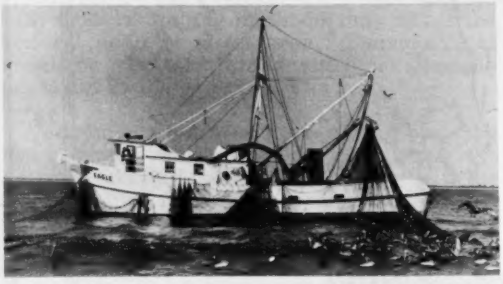


Fig. 2 - Single-boat purse-seine rig used in thread herring fishery.

Fig. 3 - Menhaden vessel used in thread herring fishery.

LEGAL PROBLEMS OF THE FISHERY

The new thread herring fishery has been beset with conflicts reminiscent of those in the menhaden fisheries. Sport fishing interests have become aroused, bait dealers and gill net fishermen are concerned, and conservationists view developments with misgivings. The State of Florida does not allow the taking of food fish with purse seines in territorial waters (out to 10.5 miles on the Gulf coast). The law was initially interpreted to include incidental food fish captured in thread herring sets. In November and December 1967, enforcement of the law caused the temporary withdrawal of the Louisiana vessels from the fishery. A court decision in February 1968 included an interpretation that allows a certain percentage of food fish in industrial fish catches, subject to administrative regulation by the Florida Board of Conservation. As a result, prospects for continued development of the fishery are good.

SHOULD THE FISHERY CONTINUE?

The world demand for animal protein is increasing steadily. Marine fish, particularly clupeoids, are becoming more important in supplying that need. Chapman noted in 1967 that the trend in world fish catches shows an increase in landings of clupeoid fishes from one-quarter of the catch in 1948 to about one-half in 1965. He inferred these reasons for the increased production: (1) the ocean contains more of them than of any other group presently harvested, (2) they congregate in large shoals that can be caught efficiently and cheaply, and (3) animal-husbandry practices in the past 20 years have been revolutionized by adding animal-protein supplements, primarily fish meal, to the diets of domestic fowl and mammals.

Despite increasing world utilization of industrial fish for animal food and industrial products, production in the United States has declined steadily in recent years. In 1962, the Atlantic and Gulf menhaden fisheries produced a record 2.3 billion pounds of fish but, in 1967, the yield was down to 1.2 billion pounds. The drop in production was due primarily to the failure of the Atlantic menhaden fishery. As a result, imports of fish meal increased from 44.7 percent of U. S. consumption in 1962 to 75.5 percent in 1967 (Lyles, 1968).

The new thread herring fishery is of great importance in light of these facts. A stock estimate of 1 million tons, a demonstrated catch of 5,000 tons in 4 months, the continuing decline of menhaden stocks, and the increasing world demand for animal protein--all show the definite need and feasibility of this fishery's further development.

THE NEED FOR BIOLOGICAL INFORMATION

Little has been published on the biology of thread herring--except work on its identification (Berry and Barrett, 1963) and a survey of Gulf stocks and fishing methods (Butler, 1961).

The orderly development and wise management of any fishery require considerable knowledge of the biology of exploited stocks. Although many consider the sea's resources almost limitless, a critical examination of world fisheries presents disturbing evidence to the contrary. In 1967, Moe discussed fishery production and management with special

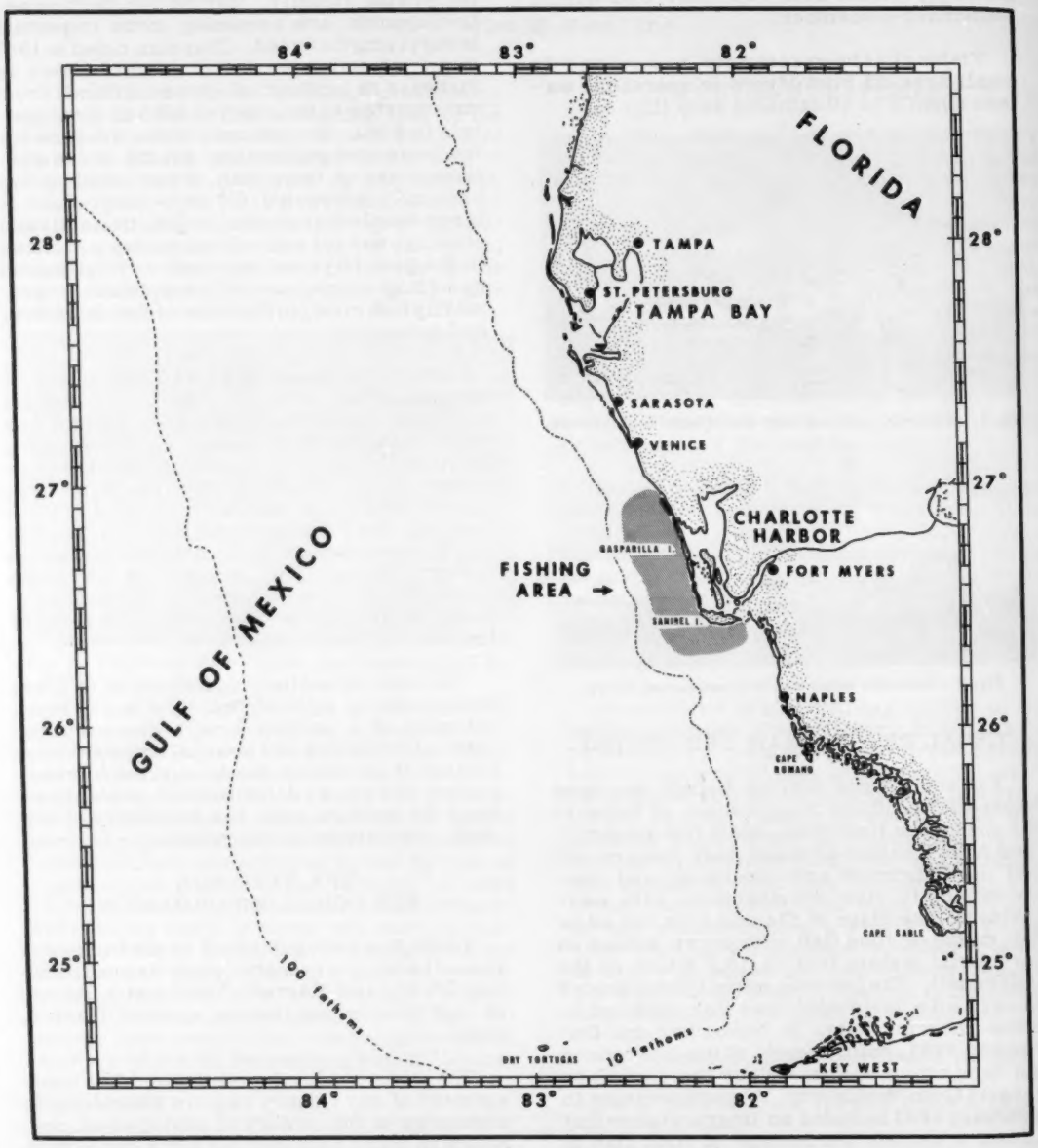


Fig. 4 - Thread herring fishing grounds on Florida west coast.

reference to purse seining. He gave examples that illustrated the effects of overfishing a marine finfish resource. He stated that the primary step toward wise management of any fishery is to develop thorough knowledge of the fish's life history.

Also, the effects of that fishery on other commercial and sport fishes should be understood. Heavy exploitation of a single species with modern fishing methods may affect the general ecology of an area. These effects should be monitored along with those directly pertinent to the exploited stock.

Many controversies have arisen over the use of purse seines for menhaden along the Atlantic and Gulf coasts, particularly with the taking of food fish. This problem prompted studies by Smith (1896), Knapp (1948), Baughman (1950), and Gunter (1963). They concluded that a purse-seine fishery has a negligible effect on food and sport fishes because the numbers taken are insignificant. Initial analyses of catches of thread herring by the St. Petersburg Beach Laboratory and the Pascagoula Exploratory Fishing and Gear Research Base show that food fish constitute only 0.35 percent of the catch. However, the question is not resolved to the satisfaction of all conservationists.

BIOLOGY OF INDUSTRIAL SCHOOLFISHES PROGRAM

Therefore, biological studies on thread herring are extremely important to the development of the fishery. Recognizing possible developments, our laboratory began the Biology of Industrial Schoolfishes Program on July 1, 1967.

The program will investigate the biology of all potentially important industrial schoolfish (excepting menhaden) in the eastern Gulf of Mexico. Limited funds and personnel, however, will restrict initial studies to thread herring, particularly to life history and distribution. Objectives are to:

1. Define the life history of the important industrial schoolfishes of the area.

2. Determine seasonal and annual migrations and fluctuations in abundance.

3. Understand the influence of environmental factors on the movements, behavior, and concentrations of the fishes.

4. Document the importance of contiguous estuaries and determine the origin of fish stocks.

5. Contribute to the taxonomic literature of various species, particularly the juvenile and postlarval stages.

6. Determine behavioral patterns that include feeding habits, schooling characteristics, diel activity, and responses to natural stimuli.

7. Conduct oceanographic surveys of the area for seasonal changes of temperature, salinity, water currents, and water clarity.

8. Understand the effects of fishing pressures and natural mortality on the population dynamics of the species.

9. Construct estimates of maximum sustainable yields, formulate management principles for the fishery, and develop methods to forecast distribution and abundance of stocks.

INITIAL RESEARCH

Field sampling already had begun in April 1967, when the laboratory's research vessel "Kingfish" was equipped with a hydraulic gill net power block (figs. 5 and 6). Monofilament gill nets of various mesh sizes are used for sampling in the deeper parts of estuaries and the Gulf. Plankton tows are made at each gill net station and oceanographic data are recorded. Beach seines and lift nets are used in shallow areas and near docks and bridges. Sampling to date has been limited to Tampa Bay, the Charlotte Harbor-Pine Island Sound area, and nearshore Gulf waters between the two estuaries (fig. 4).

Fig. 5 - R/V Kingfish hauling a gill net with a power block.

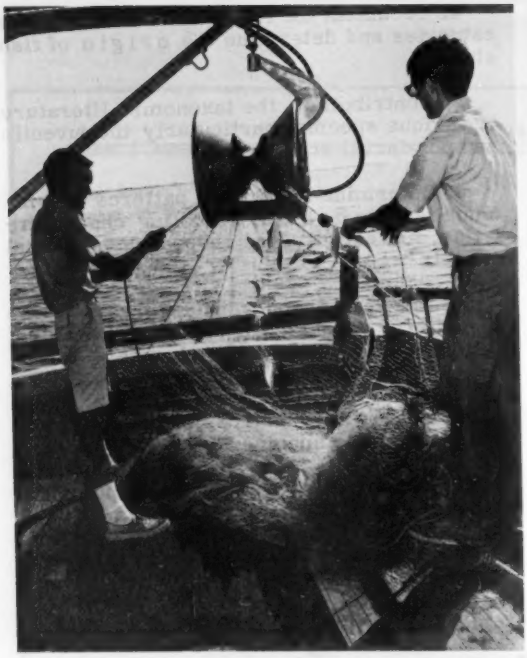


Fig. 6 - Thread herring gilled in a 2-inch monofilament gill net.

Samples have been collected from the commercial catch since the beginning of the fishery off Fort Myers. A systematic port sampling program is beyond our means at present, but the fishermen have been cooperative in preserving samples from individual purse-seine catches. Fishing log books and charts were provided for all vessels engaged in the fishery to document catches, effort, and fishing areas.

Laboratory processing of fish samples includes measurements of body length and depth, body weight, and gonad weight. Sex is determined, and scale, stomach, and gonad samples are preserved for analysis.

Some highlights of research results to date (April 1967-February 1968) are:

1. Thread herring catches per unit of effort (30-minute set with a 2-inch-mesh monofilament gill net) in Gulf waters off St. Petersburg Beach reached a peak in early summer and declined with falling water temperature in the fall. Heavy concentrations of fish (as shown by commercial fishing) off Fort Myers during fall and winter indicate a general southerly or possibly offshore movement when coastal waters are cooling. Schools of thread herring, however, do occur off St. Petersburg in winter (Butler, 1961).

2. Juvenile thread herring appeared in beach seine samples along Gulf beaches in the St. Petersburg area during summer and disappeared by fall, indicating an offshore movement of juveniles.

3. Thread herring had fully developed gonads at $5\frac{1}{2}$ to $6\frac{1}{2}$ inches fork length off St. Petersburg Beach in early April. Spent gonads, indicative of spawning, appeared by late May when water temperature was about 81° F. Gonad development indicates a spawning peak in June. No gonads were ripe in July. The gonads of fish from commercial catches off Fort Myers during winter have been undeveloped.

4. The ratio of males to females in the summer thread herring population off St. Petersburg Beach was about 1 to 5; that of the winter population off Fort Myers was about 1 to 1.

5. Thread herring with a mean fork length of about 6 inches constitute the bulk of commercial catches in the Fort Myers area.

6. Preliminary analyses of catches of purse seines show that the only important food fish in purse-seine catches have been sand sea trout (Cynoscion arenarius; 0.15% of catch) and spanish mackerel (Scomberomorus maculatus; 0.19% of catch).

COOPERATION WITH INDUSTRY

We have tried to maintain close contact with industry in the development of the fishery. Plant operators and fishermen have been very cooperative in providing catch statistics and samples. They have shown much interest in the biological aspects of the fishery.

We have attempted to provide direct services to the new industry when requested. Fishing trials with monofilament gill nets of various mesh sizes were made in the Fort Myers area for fishermen to establish the minimum size required to prevent gilling of fish. The information was used in the selection of purse-seine netting. Laboratory personnel also have served as expert witnesses in court proceedings to give testimony on the quantities of food fish in purse-seine catches. The data presented were instrumental in obtaining a favorable court decision for continuation of the fishery.

LITERATURE CITED

BAUGHMAN, J. L.
1950. Effect of menhaden operations. Seafood Business, May: 29.

BERRY, FREDERICK H. and IZADORE BARRETT
1963. Gillraker analysis and speciation in the thread herring genus Opisthonema. Inter-Amer. Trop. Tuna Comm., Bull., vol. 7, no. 2, pp. 1-190.

BULLIS, HARVEY R., Jr. and JOHN R. THOMPSON
1967. Progress in exploratory fishing and gear research in Region 2, Fiscal Year 1966. U. S. Fish Wildl. Serv. Circ. no. 265, pp. 1-14.

BUREAU OF COMMERCIAL FISHERIES
1967. U. S. catch is lowest since 1943. Com. Fish. Rev., vol. 29, no. 12, pp. 1-3.

BUTLER, JOHNNY A.
1961. Development of a thread-herring fishery in the Gulf of Mexico. Com. Fish. Rev., vol. 23, no. 9, pp. 12-17. (Also Sep. No. 628.)

CHAPMAN, WILBERT M.
1967. How space research can help develop fisheries. Ocean Industry, vol. 2, no. 5, pp. 43-49.

GUNTER, GORDON
1963. Gulf of Mexico menhaden fishery in relation to the sports fisheries. Proc. Gulf Carib. Fish. Inst. 16th Annu. Sess., pp. 99-108.

KNAPP, FRANK T.
1948. A partial analysis of the Texas menhaden problem with notes on the food of the more important fishes of the Texas Gulf coast. Rep. Mar. Lab., Tex. Game Fish Oyster Comm. for the Fiscal Year 1947-1948, pp. 42-60.

LYLES, CHARLES H.
1968. Fisheries of the United States 1967.

MOE, MARTIN A., Jr.
1967. Basic considerations of fishery production and management with special reference to purse nets. Fla. State Board Conserv. Spec. Sci. Rep. no. 20, pp. 1-12.

SMITH, HUGH M.
1896. Notes on an investigation of the menhaden fishery in 1894, with special reference to the food-fishes taken. Bull. U. S. Fish Comm., vol. 15, for 1895, pp. 285-302.

SYKES, JAMES E.
1967. Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, Fiscal Year 1966. U. S. Fish Wildl. Serv. Circ. no. 257, pp. 1-18.

FISH HEARING LIKENED TO HUMAN SMELL

A fish is in about the same predicament as a man trying to determine the source of an odor as far as telling the location of a sound source is concerned, the Acoustical Society of America meeting in New York was told by Prof. Willem van Bergeijk of the Center for Neural Sciences at Indiana University. Because humans have only one nose, the only way they can detect the direction of a smell is by "sniffing it out," trying here and there until stumbling upon the source. It is believed fish have the same problem locating the direction of a sound since fish have only one middle ear.

Fish can locate a sound source if they are close to it, but they do this through their lateral line (tiny sensory buds spread over the body) which is sensitive not to sound but to the small water currents near the sound source, such as those caused by a wriggling worm. (Reprinted, with permission from "Science News," weekly summary of current science, copyright 1966 by Science Service, Inc.)

RECENT INNOVATIONS FOR TRAWL NET REELS

By William L. High*

Over 90% of Pacific Northwest United States trawlers now are equipped with trawl net reels. Reels permit many vessel crews to be reduced from 4 to 3 men. Hydraulic power has largely replaced the original cable drive "yo-yo" system. Restrictive flanges on reels confine the groundlines. Flanges bolted around the core allow convenient adjustment. The trawler "Westness" has a net reel that holds 2 complete trawls, and the crew can set either trawl with no loss in fishing time. The net reel aboard the Bureau of Commercial Fisheries Research Vessel "John N. Cobb" has been modified so that it also operates as a constant-tension winch. Most net reel-equipped trawlers also have a stern rail roller to reduce chaffing and wear to web and groundlines as they slide over the stern.

Trawl net reels were first introduced to United States fishermen of the Pacific Northwest in 1954 (Alverson, 1959). The reel greatly reduced the work while setting or retrieving a trawl. Many captains credit the trawl net reel as being a major factor in reducing their crews from 4 to 3 men. Since no major modifications to vessel or gear were necessary, the reel was easily installed on nearly any stern trawler (Wathne, 1959).

A net reel provides several advantages over the early method of fishing, which used bypass links to wind groundlines on the main towing winch and to strap in the net. Now, the groundlines are transferred from the otter board to the reel and are quickly wound onto the drum. Forward sections of the trawl are also wound onto the drum before the bag is maneuvered to the vessel's starboard side for unloading. Since the net is no longer lifted high into the rigging while the web is strapped in, chances of injury to fishermen by the swinging floats are eliminated.

RECENT INNOVATIONS

Since 1954, numerous worthwhile improvements have been made on net reels:

Hydraulic Drives

Early reels were turned by a cable wound around the reel and attached to the main winch. The cable was rewound onto the reel by water resistance on the trawl as it was set over the stern. This technique was called "yo-yo" power (Lippa, 1967) and has now been replaced largely by hydraulic power sources.

Groundline Flanges

The basic design of the trawl net reel requires fishermen to guide the retrieved groundlines evenly back and forth on the reel core. This action prevents cable from building up excessively and the trawl being recovered unevenly. Also, groundlines sometimes foul if unattended.

To eliminate the need for levelwinding groundlines by hand, some captains have added a second flange about 12 inches inside each end flange (Fig. 1). Groundlines are wound within this restricted area and need not be closely attended. As the net reaches the reel, the groundlines are pushed through a notch on the inside flange (Fig. 2) and the net wound on the center part of the reel. Until recently, the inside flanges were welded to the core, but a more versatile means is illustrated in figs. 1 and 2. The flange is securely bolted around the core and can easily be removed or adjusted.

Dual-Section Reels

The trawler Westness has incorporated a useful modification that allows the crew to change trawls rapidly. This net reel is very large and is divided in the middle with a flange (Fig. 3). One net complete with groundlines is attached to each section. The value of the dual-section reel is twofold. First, most trawlers carry at least one spare trawl in the event that gear is lost or damaged severely while fishing. If a spare net is carried on the reel, no fishing time is lost when the primary net requires repair--because this can be

*Assistant Chief, Gear Research Unit, BCF, Exploratory Fishing and Gear Research Base, Seattle, Wash. 98102.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 817

done while the spare trawl is used during the next tow. Secondly, captains like to have one net rigged that sweeps the bottom when capturing flatfishes and another that has a high mouth opening for capturing rockfishes.

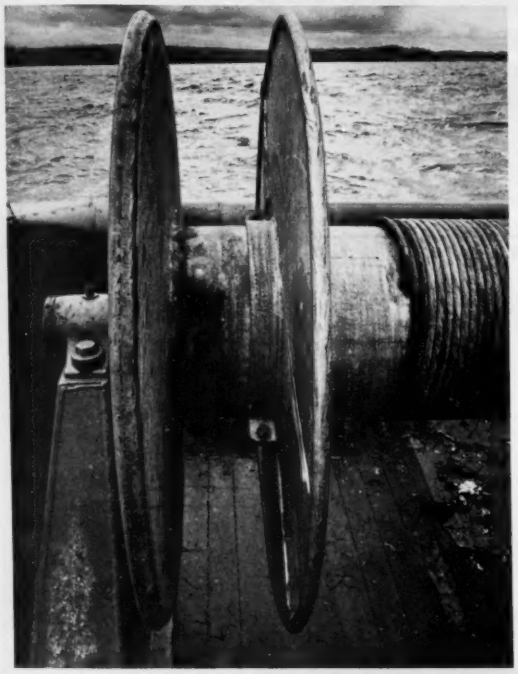


Fig. 1 - Dual flanges keep the net groundlines in a restricted section with minimal supervision. Note that the inside flange is of two half circles bolted around the drum core to permit easy removal or adjustment of width.

Fig. 2 - When the groundlines are nearly retrieved, they are pushed through a notch in the inner flange so that the trawl will be wrapped onto the center portion of the core.

If the captain operates with nets having different fishing characteristics, he can immediately set whichever trawl is appropriate. It is only necessary to firmly tie the unused net in place so that it will not loosen when the reel rotates.

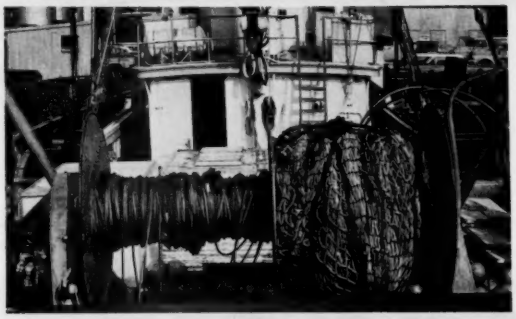


Fig. 3 - The stern trawler Westness is shown with a dual-section net reel, which can hold two nets simultaneously. Either trawl may be set without adjustments because the remaining trawl is firmly lashed in place while the reel is turned.

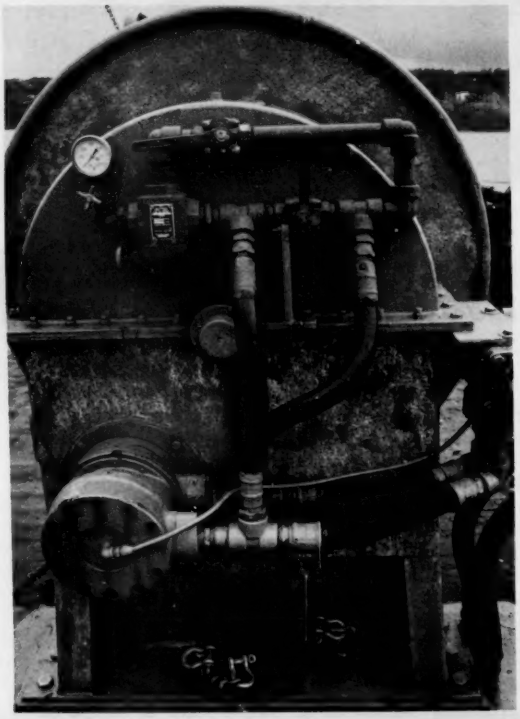


Fig. 4 - The hydraulic bypass system on the John N. Cobb's trawl net reel. This system allows the net reel to be used as a constant-tension winch.

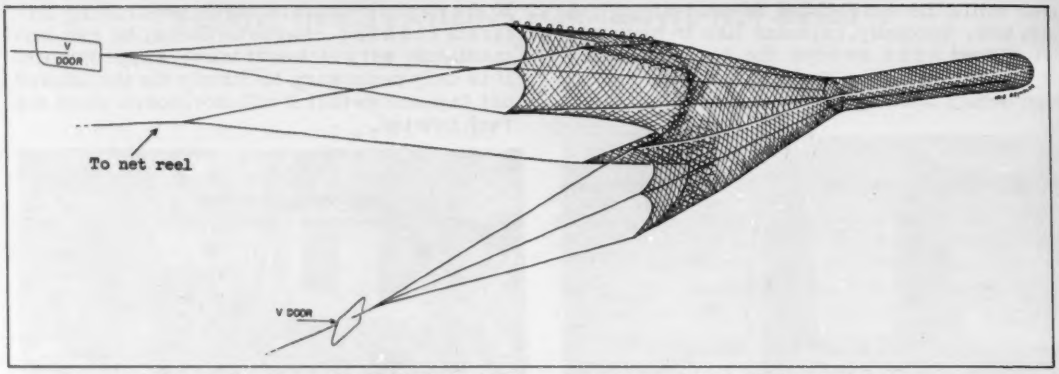


Fig. 5 - Arrangement of an eight-bridle trawl using a trawl net reel for the third towing point.

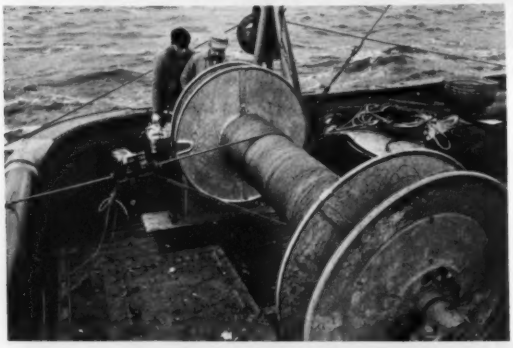


Fig. 6 - Trawl net reel modified to operate as a constant-tension winch and net reel. A cable meter is attached to the third wire after the net has been wound off the reel. Note the quick disconnect waterproof plug near the axle on the end flange, which links telemetry packages on the trawl to the vessel by electromechanical towing cable. A stern rail roller is shown at the left of the picture. (Photos: William L. High)

Use As a Third Wire Winch

The Bureau of Commercial Fisheries has modified the trawl net reel aboard its research vessel John N. Cobb to work also as a constant tension third wire winch in which the tension is varied manually. This third wire system also allows an electrical core wire to be linked with the trawl for various applications. The reel hydraulic power supply has a bypass system operating in parallel to the reel's normal hydraulic system (Fig. 4). A controllable relief valve is installed in the bypass to regulate tension to the desired magnitude. As the tension changes from that selected at the control valve, the reel automatically winds in or out to take in slack or pay out cable, thus maintaining the proper balance. A selector valve is operated to return the reel to its net-handling function.

The John N. Cobb's constant tension net reel has been used as an additional towing point for an experimental 8-bridle midwater trawl. Thirty-fathom bridles from the center headrope and footrope were joined to a single cable wound onto the net reel (Fig. 5). The distribution of towing strain could be altered between the two main trawl cables and the third wire by a simple adjustment of the hydraulic pressure relief valve (Fig. 6).

By installing a single electromechanical towing cable on the reel, the system was easily used to place a third wire depth telemetry system on a midwater trawl. The third wire system eliminates the need for underwater connectors to pass telemetry beyond the otter board to the trawl. Also, it allows use of conventional trawl cable on port and starboard tow points. This results in lower installation costs of telemetry equipment.

Stern Rollers

Trawlers with net reels soon found that a stern rail roller was a valuable addition. About 80 percent of the Pacific Northwest trawlers that have net reels also use a stern rail roller. It greatly reduces chaffing and wear to web and groundlines as they slide over the stern. Rollers are constructed of 8- to 10-inch steel pipe. The length of the rolling surface depends on the vessel and net reel width, but it usually equals the full width of the net reel (Fig. 6). Bearings at each end allow the roller to rotate freely. A portion of the rail is cut away to install the roller nearly flush with the rail top.

LITERATURE CITED

ALVERSON, DAYTON L.
1959. Trends in trawling methods and gear on the west coast of the United States. In Hilmar Kristjonsson [editor] Modern Fishing Gear of the World. Fishing News (Books) Ltd., London, pp. 317-320.

LIPPA, E. J. R.
1967. British Columbia trawlers and trawling. Fisheries Research Board of Canada, Technical Report No. 13, 44 pp.

WATHNE, FRED
1959. Pacific coast drum trawling. Commercial Fisheries Review, 21(12), December: 34-36.

BUSY DAY CANAPES

1 jar (12 ounces) herring in sour cream
1 large cucumber
2 teaspoons salt
3 cups ice water
1 loaf (8 ounces) party rye bread
2 tablespoons butter or margarine, softened
Paprika

Wash cucumber. Score cucumber by running a sharp-tined fork down the length of the cucumber from end to end. Cut crosswise into very thin slices. Place in a bowl of salted ice water and let stand 30 minutes to crisp. Drain on absorbent paper. Spread bread with butter. Overlap 2 slices cucumber on each slice of bread. Top cucumber with 1 large or 2 small pieces of herring. Sprinkle with paprika. Makes approximately 24 canapes.

This idea for entertaining is from a 22-page, full color booklet, "Nautical Notions for Nibbling," released by the United States Department of the Interior's BCF. It is available for 45¢ from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Ask for Market Development Series No. 10 (catalog no. I-49.49/2:10).

SAFETY FOR THE COMMERCIAL FISHING VESSEL AND CREW

By John J. Murray*

In 1959, BCF initiated a Fishing Vessel Safety Program for the New England commercial fishing fleet to reduce the accident-frequency rate of crews--and the cost of marine insurance premiums to vessel operators.

The program has concentrated on the major fishing ports of the region--Boston, New Bedford, and Gloucester, in Massachusetts, and Portland, Maine.

Marine insurance always has been and undoubtedly will continue to be expensive. To most fishing-vessel owners, insurance premium costs are the third largest operating item, ranking after wages and fuel. Steadily increasing settlements for claims resulting from personal injury or loss of life have produced corresponding increases in costs of protection and indemnity (liability) coverage. This situation is particularly acute in the New England and North Atlantic areas, where protection and indemnity loss experience has been worse than hull loss experience.

Insurance costs for fishing vessels are based mainly on the vessel's seaworthiness, how well its equipment has been maintained, the owner's operating record, and the craft's loss experience. The insurance premiums are substantial. Often, they represent the difference between profit or loss for the owners on an annual basis.

Insurance is the only one of these three costs susceptible to direct control through a safety program that will detect and correct unsafe conditions and practices.

Insurer Sets Rates

Marine insurance rates are not regulated by state insurance authorities. The rate to a vessel is determined by the insurance company, which weighs certain variables in arriving at it. Hull insurance premiums are based on a percentage of the vessel's appraised value determined by the insurer. For example, if a vessel appraised at $100,000 is accorded a 4% rate, the owner is assessed a $4,000 annual premium. Vessel age is a major factor in setting this rate. There is a widespread difference between hull insurance premiums for representative vessels over 10 years old and those not over 5:

Table 1 - Hull Insurance Premiums for Certain New England Commercial Fishing Vessels

Vessel	Built	Appraised Value	Annual Premium	Rate Percent	Cost Per $1,000 Valuation
			Vessels Over 10 Years Old		
		$	$	%	$
"A"	1944	60,000	3,300	5.5	55
"B"	1949	20,000	1,600	8	80
"C"	1929	22,000	1,980	9	90
"D"	1949	35,000	3,150	9	90
"E"	1944	25,000	2,500	10	100
			Average Rate	8.3	
			Vessels Under 10 Years Old		
"A"	1962	80,000	3,200	4	40
"B"	1963	50,000	1,750	3.5	35
"C"	1963	125,000	6,625	5.3	53
"D"	1958	125,000	6,250	5	50
"E"	1960	100,000	4,000	4	40
			Average Rate	4.3	

Fig. 1 - New Bedford scalloper built in 1936. Vessels of this age invariably face low appraisal values and high insurance rates. (Photo: Robert K. Brigham)

*Regional Safety Officer, BCF, Gloucester, Mass.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 818

Fig. 2 - New Bedford scalloper built in 1966. Such vessels enjoy high appraisal values and reduced insurance rates.

All these vessels are medium-size otter trawlers or scallop dredgers fishing the same areas under similar conditions throughout the year. The major variant is age.

Personal Injury

Protection and indemnity (liability) coverage for claims arising from personal injury to crew members is increasingly expensive to the vessel operator. Claim awards in the New England area have increased greatly, with correspondingly higher premiums.

Protection and indemnity rates are set on a per-capita/per-annum basis for each vessel. For example, an owner who operates a vessel with 10 men may pay $600 per man, or $6,000 annually, for this protection. It is customary to provide this insurance for all crew members, but records show instances where certain men are specifically excepted. This is noted generally on family-owned vessels where relatives of the owner or owner-captain are excluded from protection and indemnity benefits. This practice reduces the initial cost to the owner, but often it results in serious legal and financial trouble when an uninsured fisherman suffers a major shipboard injury.

While vessel age plays a part in setting premiums for protection and indemnity coverage, it is less than that in hull coverage. The role of vessel age in protection and indemnity costs for similar vessels is shown in table 2.

Table 2 - Comparative Protection and Indemnity Costs for Vessels of Different Ages

Vessel	Year Built	Limit of Liability	Number of Crew Men	Annual Cost Per Man
		$		$
"A"	1965	300,000	5	275
"B"	1963	300,000	6	340
"C"	1938	300,000	9	555

Previous loss experience, maintenance standards, character and reputation of the vessel's captain and owner--all influence the insurer at rate-setting time.

Causes of Accidents

BCF has learned much about the nature and causes of shipboard accidents. About 80 of every 100 shipboard accidents are personal injuries. A BCF study of 385 personal injuries over a 4-year period shows:

Cause	Number	Percent
Falls--		
On deck	96	23
Elsewhere	19	7
Hit by objects	86	20
Hit by sea	29	8
Trawl winch operation injuries	22	8
Hand injuries	16	4

The remaining 32 percent includes knife wounds, fish bones in hands, burns, eye injuries, etc.

Nearly 75 percent of the claims stemming from these accidents is less than $350 per claimant. This large percentage of petty claims is important in setting the level of annual insurance costs to vessel owners.

BCF Recommendations

BCF acted to reduce accidents caused mainly by unsafe conditions. Its Safety Unit strongly urged adoption of the following measures to reduce falling accidents:

1. Instal skid-resistant bridge flooring on deck, winch platform, companionway ladders, and engineroom floors. This measure has been highly successful and widely adopted by the industry.

2. Provide and rig life lines stretching from forecastle aft to breakdeck for use during heavy weather.

3. Instal protective guard rails around deck bollards and in front of trawl winches.

4. Practice good housekeeping to prevent oil and fuel leaks on deck.

5. Provide ladders for boarding and debarking from moored vessels.

The response to these recommendations has been excellent; probably the best results noted were the installation of skid-resistant material on vessel decks. This is now common practice on most small and medium-size vessels.

The need for fishermen to wear safety hats while unloading fish has been stressed. The initial response to this recommendation was the presentation by the Seafood Producers' Association of New Bedford, Mass., of 100 safety hats to local stevedores. While not all 100 hats can be seen today, a fair amount is worn by New Bedford, Gloucester, and Boston fishermen.

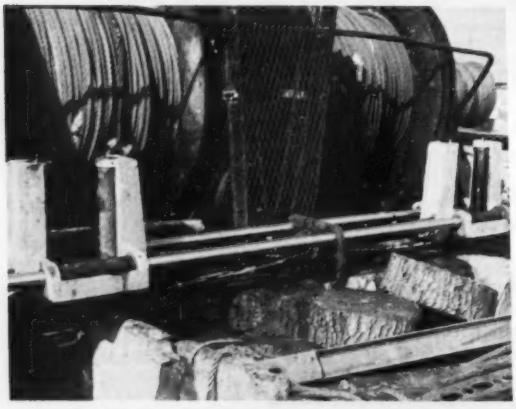


Fig. 3 - Level wire winder on trawling winch of large otter trawler. Winder is operated by winch men and eliminates hazardous operation by fishermen in front of winch.

Fig. 4 - Hand steering wire on trawling winch, the cause of many injuries in otter trawling fleet.

To reduce the hazards of trawl winch operations, installation of level wire winders has been urged particularly in manually steering trawl wire on the drums. Adoption of this measure has been moderately good--mostly confined to newer vessels in the large otter trawl class.

Marine Safety Messages

In 1961, BCF initiated a series of vessel safety bulletins pointing out hazards and potential accident sources and recommending corrective measures.

The messages were circulated widely. Radio Stations WBSM, New Bedford, WESX, Salem, and WHDH, Boston, broadcast the bulletins along with daily fishing information programs. Copies also were mailed to fishing vessel owners and operators and to all newspapers in the major fishing ports. The papers carried the bulletins in their waterfront news columns.

Between January 1961 and October 1967, 23 safety messages were issued to the fishing industry. They covered such subjects as: installation of ladders on scallop booms; annual inspection of dories and lifesaving equipment; annual inspection of fire-fighting equipment; measures to reduce number of shipboard falls; low reaction of wooden vessels to radar detection; annual inspection of overhead rigging; measures to prevent collisions at sea; annual inspection of inflatable life rafts; handling explosives snagged in fishing gear; obtaining medical aid; and other subjects.

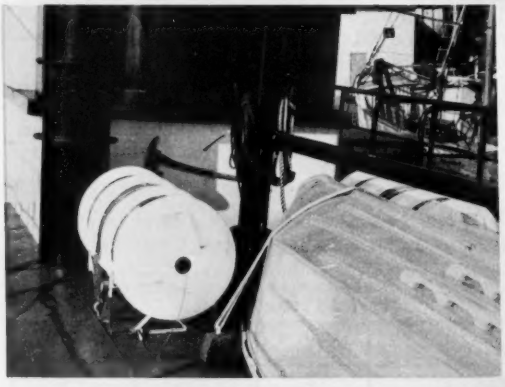


Fig. 5 - Inflatable life raft for 15 men stowed on deck of Boston-based large otter trawler. It is fitted with hydrostatic release mechanism. (Photos: J. J. Murray)

Safety Equipment Demonstrations

Another effective phase of the work has been practical dockside demonstrations of approved marine safety equipment to vessel owners. Displays in trade association halls and marine insurance company offices ranged from 10-man inflatable life rafts to vest-pocket emergency distress flare kits.

In cooperation with the U. S. Coast Guard, the emergency dewatering pump unit used to assist fishing vessels in search-and-rescue operations figured prominently in the demonstrations.

Safety applicances displayed included: emergency dewatering pumps - first aid fire extinguishers, radar targets for use by wooden vessels, safety hats and boots, fire detection and alarm systems, distress and identification signals, and skid-resistant decking material.

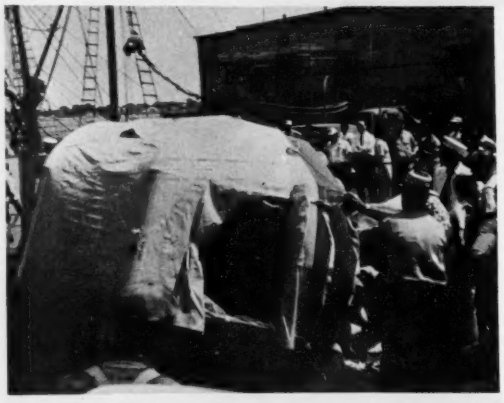


Fig. 6 - Demonstration of inflatable life raft to fishing vessel owners at New Bedford, Mass. (Photos: J. J. Murray)

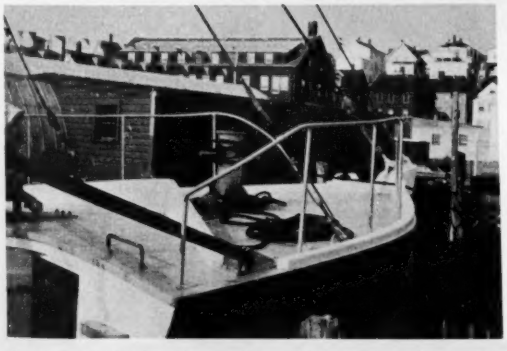


Fig. 7 - Guard rail on forecastle head fully protects fishermen working in this exposed position.

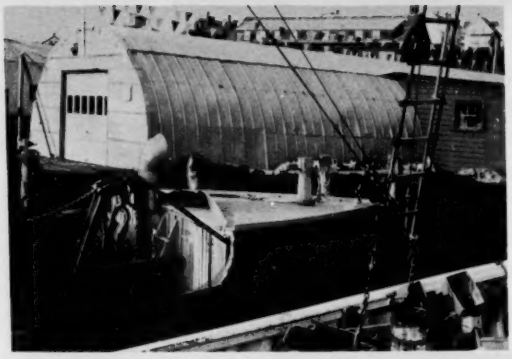


Fig. 8 - Absence of guard rail is hazard on forecastle head of medium otter trawler.

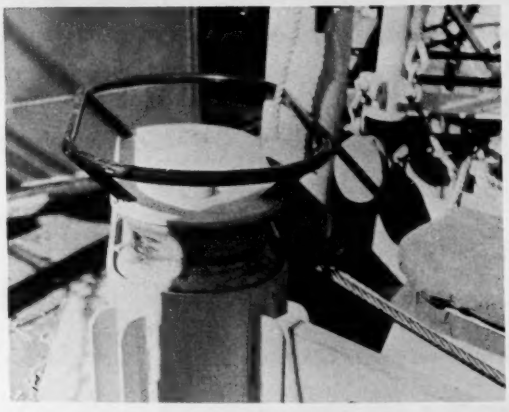


Fig. 9 - Guard around deck bollard of Boston large otter trawler. This safety device is mandatory on European distant-water trawlers. It has recently gained acceptance in U. S.

Results have been encouraging. The adoption by the fleet of these devices has been widespread. In the past 3 years, over 150 pieces of marine safety equipment have been installed on New Bedford vessels alone.

Fishermen's Training Program

BCF worked closely with the U. S. Department of Labor in the planning, instruction, and successful completion of 12 on-the-job fishermen training courses in Boston, Gloucester, and New Bedford.

The program aimed at training men for the fisheries. Since it began in 1965, it has added

about 88 men to the fleet. On-the-job safety was stressed in all courses. The dual objectives were to alert trainees to the hazards and dangers of commercial fishing--and to eliminate shipboard accidents.

During 7 training periods--from August 1965 in Boston to November 1967 in New Bedford--instructors from BCF's Fishing Vessel Safety Unit devoted over 100 hours to teaching the fundamentals of marine safety.

The value of the safety instruction was best illustrated by the nearly accident-free record of the trainees during their work aboard the vessels.

Fig. 10 - Author instructing trainees in steering trawl wire on trawl winch at New Bedford. (Photo: Robert K. Brigham)

Further Aid to Fleet

BCF also has worked closely with industry in sponsoring other safety activities. For example, when the revised "International Rules of the Road" were slated to become effective on Sept. 1, 1965, there was some confusion about the possible effect on fishing operations. In cooperation with the U. S. Coast Guard, BCF's Safety Unit documented the rule changes affecting commercial fishing vessels in a safety bulletin and a pamphlet. The publications, which presented a simplified version of selected "International Rules" most important to fishermen, were distributed to U. S. and foreign operators. Over 5,000 copies of the bulletin and 10,000 of the pamphlet were issued.

In September 1967, BCF's Regional Safety Officer issued a bulletin outlining the newly established "Sea Lanes" for vessels entering or departing New York Harbor; 200 copies were sent to vessel owners. This information is extremely important to vessels fishing or traversing this area, especially during low visibility.

The most recent safety message gives the location of the platform of Texas Tower #2 that foundered on the northern edge of Georges Bank in October 1963. Fishing vessels have reported fouling the structure and suffering substantial loss and damage to their fishing gear.

In cooperation with the U. S. Public Health Service, a bulletin listing the procedure for obtaining medical advice for injured or ill fishermen was prepared and distributed to vessel operators on the Atlantic Coast and Gulf of Mexico, from Maine to Texas. About 500 bulletins were distributed in the New England area.

A project underway involves the use of identification banners for fishing vessels requiring assistance at sea. Use of these banners is advocated by the Coast Guard, which reports the problem of identifying fishing vessels in distress and awaiting assistance on the fishing banks.

In May 1967, the Coast Guard accorded official recognition to the Canadian small craft-to-air distress identification signal. This consists of a 72- by 45-inch, fluorescent, orange-red, cloth panel bearing an 18-inch black square and 18-inch black circle, 18 inches apart, on the flag's major axis. A

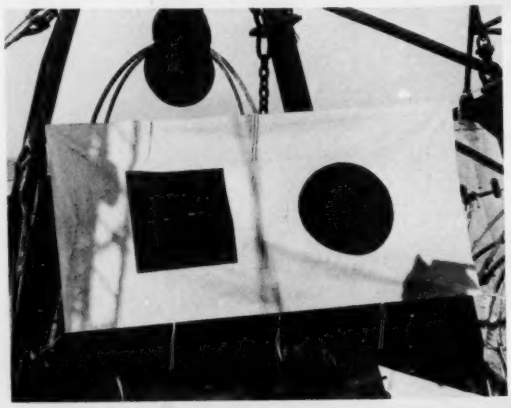


Fig. 11 - Small-craft distress identification signal. (Photo: J. J. Murray)

Fig. 12 - Emergency dewatering pump used by Search-and-Rescue Division of U. S. Coast Guard in assisting sinking fishing vessels. Gasoline-operated pump is packed in steel drum with intake and discharge hoses and lowered from helicopter or parachuted. (Photos 12, 14: J. J. Murray)

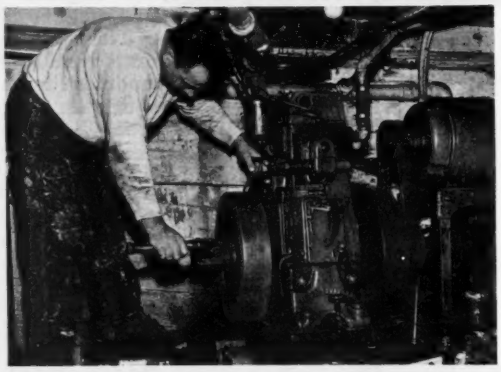


Fig. 13 - Unsafe conditions in engineroom of fishing trawler. Cramped quarters for starting generating unit, unguarded V belts, naked light bulb, and poor housekeeping create extreme hazards.

BCF safety message has recommended this signal to U. S. fishermen and vessel operators.

Currently, a photo identification file of all documented fishing vessels in the First Coast Guard District is being compiled for the Coast Guard Search and Rescue Branch. The file will include information on physical characteristics, fishing methods, and areas normally worked.

This is a facsimile of information card attached to each photo:

VESSEL: Pelican	OFFICIAL NO.: 254 482
PORT: Boston	FISHERY: Otter Trawl
OWNER: John B. Doe, 18 South St., Boston, Mass. 02210	
TONNAGE: GROSS 138	NET: 65
CONSTRUCTION: Wood	
DIMENSIONS: LENGTH: 90	BREADTH: 21 DEPTH: 10
FISHING AREAS: Georges Bank - South Channel	

Federal Regulations

Commercial fishing vessels are subject to navigation and inspection laws stated in "Rules and Regulations for Uninspected Vessels," Coast Guard pamphlet CG 258. These requirements cover navigation lights and shapes, whistles, fog horns and fog sound signal devices, life preservers and other life-saving equipment, fire extinguishing equipment, carburetor flame arresters for gasoline engines and ventilation rules for tanks and engine spaces. Requirements concerning lights and sound signal devices are primarily concerned with insuring proper navigation and identification of the type of vessel to reduce risk of collision.

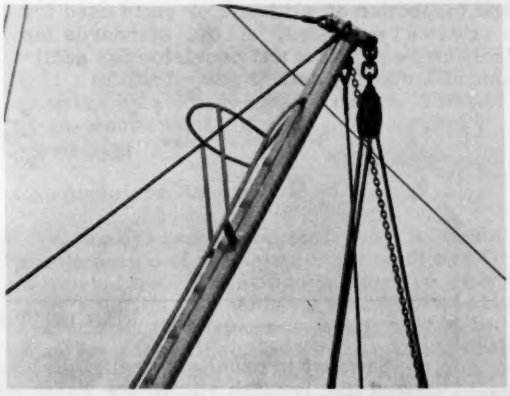


Fig. 14 - Safety ladder on boom of New Bedford scallop dredger.

The documented fishing vessels of 200 gross tons and up are subject to more requirements of licensing deck and engineroom personnel.

The absence of any regulations concerning the installation, certification, or inspection of lifeboats, life floats, and similar debarking equipment is a serious gap in the safety standards of the fishing fleet. Examination of the

requirements for uninspected vessels reveals that the sole safety items required by a commercial fishing vessel are life preservers and fire extinguishers.

SUGGESTED INDUSTRY SAFETY PROGRAM FOR NEW ENGLAND COMMERCIAL FISHING VESSELS

The problem of safety is not a simple one. The objective of industry safety committees of owners and crews should be to recognize the areas of major importance and to set standards and guide lines for the consideration of all industry groups.

Some fundamental measures that should be considered are:

1. Form industry advisory groups in all major fishing areas. The group should include representatives of fishermen, owners, and insurers. They should advise industry and Federal agencies on safety of fishermen and fleet.

2. Establish standards for lifeboats and dories used for lifesaving purposes. Standards should cover installation, certification, and inspection of all boats or rafts used for survival purposes. Also, standards for launching equipment and provision for semi-annual launching drills.

3. Incorporate approved marine safety measures in all newly constructed vessels--non-skid decking, bollard guards, engine-room color coding, fire detection and alarm system, deck-located shut-off valve for main engine, metal covers over trawl wires leading from forward deck bollards to gallows base, dual bilge pumping lines, and self-contained water pump for emergency.

4. Equip selected vessels with emergency water pumps as stand-by equipment for transfer to distressed vessels on fishing grounds.

5. Cooperate with local fire departments to conduct annual fire prevention and fire protection survey of all vessels.

Basically, prevention of shipboard accidents is a matter for owner and crew. Information on marine safety from insurance companies, Federal agencies, and engineering firms is useless unless owners and crews cooperate and act on this advice. They should establish safety or loss-prevention units in all major fishing ports. Also important is an accident-reporting system in which all vessels can furnish accident reports. These data are essential to establish accident frequency rates--and to evaluate the program's effectiveness.

FISH DUST ELIMINATED

Sawdust is usually a negligible loss, but when the dust comes from sawing frozen fish for fish sticks, the waste means considerable cost.

A heat treatment developed by the British Ministry of Technology's Torrey Research Station in Aberdeen, Scotland, eliminates the sawdust problem. The fish slabs, about an inch and a half thick, are placed between heated platens and brought quickly to 12° F. In that condition, they can be chopped without waste.

Before the new technique was developed, the fish had to be warmed gradually for 48 hours, and losses occurred from soft fish flaking off from the edges. (Reprinted, with permission from "Science News," weekly summary of current science, copyright 1966 by Science Service, Inc.)

INTERNATIONAL

Soviets and Poles to Buy Danish Propulsion Engines

Several executives and technicians of Burmeister and Wain Motors (B & W), Copenhagen, Denmark, visited Poland early in April to introduce new 1968 B & W marine engines for fishing and other vessels. B & W began a sales campaign in Copenhagen in February 1968 for West European buyers. The Polish sales campaign results from a licensing agreement B & W has with a Polish state-owned ship-building firm since 1959. In 1967 alone, 17 propulsion engines totaling 205,000 hp. were built in Poland under licensing arrangements with B & W. On Jan. 1, 1968, the licensing agreement was transferred to the Cegielski machine plant in Poznan. Besides Cegielski, such engines are produced by Gdansk Shipyards.

Also A Soviet Market

B & W was scheduled to extend its sales campaign in March 1968 to the Soviet Union, where the "explosive growth of the Soviet commercial fishing fleets created a large demand for propulsion engines." The demand excited Danish businessmen. ("Børsen," April 3, 1968; reported by Regional Fisheries Attaché, Copenhagen.)

Japan-USSR Northwest Pacific Talks End

The 12th Annual Meeting of the Japan-USSR Northwest Pacific Fisheries Commission was held in Moscow beginning March 1, 1968. It ended on April 26 after 56 days of discussion.

On April 25, agreement was reached to set the 1968 Japanese salmon catch quota in the Convention waters at 93,000 metric tons--46,500 tons each for Area A (north of 45° N. latitude) and Area B (south of 45° N. latitude); a 10-percent catch was allowed for Area B. The 1968 catch quota is 3,000 tons less than the 1966 quota, the previous lean year for pink salmon.

Soviets Accept With Conditions

The Soviet negotiators had demanded a salmon catch reduction of 87,000-88,000 tons. Finally, they accepted the 93,000-ton-quota on condition that Japan agree to the 2-week suspension of fishing in Area A and to shortening the season, as was done in 1966 and 1967.

On April 26, agreement was reached on regulation of the salmon, herring, and bottomfish fisheries, and crab fishing off Cape Olyutorski.

King Crab Agreement

The deadlock over king crab fishing in the northwestern Pacific was broken on April 18. Under a new agreement, Japan will operate this year 4 crab fleets in the Okhotsk Sea off western Kamchatka Peninsula, and the Soviet Union will operate 8 fleets. Crab production quota was set at 224,000 cases for Japan, and 432,000 cases for the Soviet Union--a total of 656,000 cases (48 ½-lb. cans).

The Japanese crab fleet had left Japan April 8 for the fishing grounds. Since April 15, when the season normally opens, it waited for instructions. On April 18, it received the green light.

Compromises Reached

At the crab talks, the controversial Soviet proclamation of the Continental Shelf was finally shelved. Both nations sought a practical solution to enable their fleets to begin operations. The Japanese also agreed to impose voluntary fleet reduction in the crab fishery off eastern Sakhalin Island. Crab fishing off Cape Olyutorski was to be discussed at a later date. ("Suisancho Nippo," Apr. 19, 1968, "Suisan Tsushin," Apr. 27, 1968.)

Japanese Seek to Negotiate Mauritania's 12-Mile Limit

The Japan Distant-water Trawlers Association invited the Mauritanian Agriculture Minister to visit Japan in May 1968. The purpose was to solicit the Minister's view on a bilateral agreement to permit Japanese fishing inside Mauritania's 12-mile exclusive fishing zone.

Mission to Mauritania

In summer 1967, the Association sent a mission to Mauritania for preliminary talks. Later, it offered to cooperate in building and operating cold storages--and in experimental fishing for Mauritania. In exchange, it asked for the right to fish within the restricted zone. The proposal was stalled by Mauritania's silence.

The Japanese Fisheries Agency also sounded out Mauritania on opening government-level talks in May 1968. As of mid-April, it had no response.

Restraint Urged on Trawlers

In view of the preparations for talks, the Trawlers Association urged restraint on its member vessels to avoid irritating West African coastal countries. ("Shin Suisan Shimbum," Apr. 22, and "Minato Shimbun," Apr. 18, 1968.)

U. S. Joins Indian Ocean Fishery Commission

The U. S. became an official member of the Indian Ocean Fishery Commission (IOFC) on April 8, 1968. IOFC's first session is planned for Sept. 1968.

The Commission was formed following a recommendation of the 48th Session of the FAO Council in June 1967. Its purpose is to develop and use the Indian Ocean area's fishery resources. (U. S. Embassy, Rome, April 11, 1968.)

1967/68 Antarctic Whale Catch

The "Norwegian Whaling Gazette," Mar.-Apr. 1968 issue, reported the 1967/68 whale catch in the Antarctic:

Expedition	Catch of Blue Whale Units	Production in Barrels			Material	
		Whale Oil	Sperm Oil	Total Oil	Floating Factories	Catchers
Norway:						
1967	292	31,720	2,520	34,240	1	5
1966	801	79,500	26,500	106,000	2	-
Japan:						
1967	1,493	171,400	4,411	175,811	4	43
1966	1,633	182,623	11,754	194,379	4	-
USSR:						
1967	1,016	1/	1/	1/	3	49
1966	1,069	1/	1/	1/	3	-
Total:						
1967	2,801	1/	1/	1/	8	97
1966	3,503	1/	1/	1/	9	-

1/Not available.

As in the last two seasons, sei whales comprised the bulk of the catch. In the 1967/68 season, 8 floating factories with 97 catcher boats were operated. This was one factory-ship less than the previous year; the Norwegians sent only one fleet this season.

Canadian Conference on Fishing Vessel Construction Materials

Jan-Olof Traung, Chief of the Fishing Vessel Section of FAO, will discuss new thinking on the use of materials for building fishing vessels at a Canadian conference in Montreal, Oct. 1-3, 1968. He will provide the keynote for more than 30 papers by Canadian and world experts.

The Conference on Fishing Vessel Construction Materials is sponsored by Canada's Federal-Provincial Atlantic Fisheries Committeee.

Many Speakers & Subjects

The conference will hear the views of Canadian naval architects, boatbuilders, materials suppliers, fishing vessel operators, and government specialists--and of specialists from the U. S., Japan, South Africa, and the leading European fishing nations. The speakers will discuss significant developments and

trends in the use of traditional and newer materials. These will include steel, wood, plywood, laminated wood, resin and glues, single-skin and cored plastics, and concrete.

Construction Techniques

Construction techniques will be the subject of several papers. Comparative assessments of the various materials and their economic possibilities will be submitted at the final session. The views of the fishing industry on the materials for future vessels also will be presented. (Canadian Department of Fisheries, Apr. 30, 1968.)

Japan to Build Fish Harbor in East Pakistan

The East Pakistan Fisheries Development Corp. (EPFDC) and Mitsui and Co. of Japan agreed April 19 on the construction of a fish harbor in the Sadarghat area of Chittagong (between 22°35' and 22°49' N. latitude and between 91°27' and 90°22' E. longitude). Construction costs will be about US$6.9 million. Foreign exchange costs are reported to be equivalent to US$2.56 million, financed by a Japanese yen credit to Pakistan.

The contract calls for completion of the project within 21 months of the April 19 signing. And, when completed, the fish harbor will provide berthing facilities for 68 seagoing trawlers capable of handling 76,000 metric tons of sea fish annually. Reportedly, preliminary work has begun on a 110-acre plot of land.

Harbor Long Planned

Pakistan has considered construction of a fish harbor for Chittagong since the Second Plan Period. Until now, however, lack of financing, and disagreement within the Government of East Pakistan over a site, have delayed the project. It was finally approved by the Executive Committee of the National Economic Council on Aug. 30, 1967.

This agreement with a Japanese firm follows a recent Japanese shrimp-purchasing team's visit to East Pakistan. The aggressive efforts of the Japanese would seem to point to a concerted effort to gain a foothold in Pakistan's fisheries industry. This is particularly true of shrimp exports which, until now, have gone largely to the U. S. (U. S. Consul, Dacca, Apr. 24, 1968.)

Norwegians and Danes Disagree Over Salmon Fishing

Norwegian anger over Danish salmon fishing continues. The Norwegians claim research has established that salmon fished in international waters off Norway are either on their way to the coast to spawn or are young fish that will not spawn until 1 or 2 years later.

Norwegians claim that Danish and Swedish fishermen reap the benefit of extensive cultivation work and conservation regulations carried out by Norwegians. The Norwegians say the Danes have doubled their salmon fleet this year, which means an even heavier exploitation of northern salmon stocks.

The Danish View

Denmark says fishing off the north Norway coast is legal; the fleet has not doubled but actually decreased; Danes adhere to international regulations on minimum size; they fish 200 nautical miles from the coast, even though fishing as close as 12 miles would be legal.

The Danish view is that the Norwegians want as many salmon as possible to enter their lakes and rivers so fishing rights can be leased to wealthy foreigners.

There has been no indication of any steps toward negotiation of an international agreement to regulate salmon fishing off the Norwegian coast. (U. S. Embassy, Copenhagen, Apr. 26, 1968.)

FOREIGN

CANADA

COHO SALMON INVESTIGATIONS UNDERWAY

The 1968 coho salmon investigation program in Juan de Fuca Strait resumed on May 1. This program was started in 1967 by the Department of Fisheries to define migratory behavior relative to abundance and feeding habits of early season coho. Information also will be obtained on effort-distribution data for sport and commercial fisheries in the Victoria-Juan de Fuca region.

The 1968 program has 2 parts: During May 1-July 1 in Area 20, the chartered commercial vessel "K Charles" will be tagging "blueback" coho in Sooke and Pedder Bay region; May 1-July 15 in Becher Bay to Glacier Point, and from Sombrio Point to Port San Juan a troll sampling survey by the chartered commercial trollers "Valiant I" and "Tidewater III."

The Department will use weekly flights between May 15 and Sept. 30 to obtain information on distribution of sport and commercial gear.

Reward for Returned Tags

Much of the success in a tagging program depends on the return of recovered tags. A one-dollar reward is offered for all tags returned to a Fishery Officer, or mailed to Regional Headquarters, Department of Fisheries, 1155 Robson Street, Vancouver 5, B. C., Canada. (Department of Fisheries, Canada, Apr. 30, 1968.)

* * *

GOVERNMENT AND INDUSTRY SPONSOR MARKET STUDY

A detailed research study of the Canadian domestic market for fishery products will start soon. The 2-year $200,000 study will be financed jointly by Federal and provincial governments and the fishing industry.

The Fisheries Council of Canada, which proposed the study on industry's behalf, will put up C$50,000, the Federal Government C$75,000, and the participating provinces the remaining C$75,000. To date, 8 provinces are supporting the project, one is considering it, and one is delaying action to see the outcome of efforts to set up a prairie fish-marketing organization.

Study's Purpose

The purpose of the market study is to secure information on which the industry may base future promotional efforts to improve sales in Canada. A firm of consultants will conduct the study.

* * *

SUMMARY OF 1967 MARINE-OIL SITUATION

Canada's marine oil production in 1967 totaled 64.1 million pounds, 9.8 percent higher than in 1966. There was a sharp drop in herring oil production in British Columbia because herring were less abundant than in former years. However, production in the Atlantic Coast expanded more than enough to offset the decline in the west.

The United Kingdom, a major marine-oil market in earlier years, returned to the market in 1967. The U. K. took 4,189,200 pounds of herring oil.

Shipments of whale oil jumped from 1.4 to 12.5 million pounds in 1967. Major markets were the Netherlands, United Kingdom, and Italy.

Marine Oil Imports

Imports of marine oil declined from 10.2 million pounds in 1966 to 7.9 million in 1967. Shipments from the U. S. declined to 1.2 million pounds from 3.1 million in 1966. (U. S. Embassy, Ottawa, Apr. 19, 1968.)

EUROPE

USSR

TO BUILD OR BUY STERN FACTORY TRAWLERS INTO 1970s

In the early 1960s, the Soviet Union ordered 65 large stern factory trawlers of the "Tropik" class from East German shipyards. The Ministry of Fisheries, through state-owned import firm SUDOIMPORT, ordered 21 more Tropik vessels--while East German shipyards were finishing designs for an even more modern "Atlantik" class. The latter has more horsepower, greater fish processing capacity, and larger holds.

The Atlantik Class

The first Atlantik-class vessel was delivered to the Soviets July 7, 1966; the 86th and last Tropik on Nov. 7, 1966, for the anniversary of the October Revolution.

A delay in further delivery of Atlantiks was caused by a temporary Soviet refusal to accept this class because of technical problems. When these were solved, East Germany produced and delivered to the USSR about 25 Atlantiks during 1967. Rate of production will increase to 30 vessels per year by 1970, when the last, 103rd, Soviet-ordered Atlantik will be launched. ("Seeverkehr," May 1967.)

The first Soviet-bought, Atlantik-class vessel began fishing in the Northeast Pacific off U. S. coasts in November 1968; on Georges Bank in the Northwest Atlantic in January 1968. Other vessels of this class operate in the South Atlantic and off California.

E. Germans Build Own

There is some indication that the East Germans are beginning to construct more fishing vessels for themselves. The former's shipyards are achieving great capacity. After 1970, East Germany may launch a second wave of southward fisheries expansion. The first, launched in 1967, reached waters off the U. S. in mid-summer of that year.

* * *

PROMOTES FISHERMEN TRAINING ON HIGH SEAS

The first fisheries training vessel was delivered to the Soviets by Burmeister and Wain (B & W) of Copenhagen, Denmark, in early March 1968. The vessel is 103 meters (337.8 feet) long and can accommodate 182 persons, including about 110 fishermen-trainees. A classroom for 25 pupils is located forward on the third deck.

The Soviet stern freezer trawler "Pelengator" was launched in March 1968. Built in a Copenhagen shipyard, she is the first Soviet vessel to be used in high-seas training of fishermen. Four similar vessels will be built. The Pelengator was assigned to the Murmansk Fisheries Administration.
(Photo: Burmeister & Wain, Copenhagen)

B & W is building 4 more similar vessels for the Soviet Ministry of Fisheries. These will bring the total educational capacity to about 550 pupils. (Fisheries Attaché, U. S. Embassy, Copenhagen, Apr. 9, 1968.)

14 Delivered by April 1968

Essentially, the training vessels are large freezer stern trawlers, which the Soviets have been ordering from B & W for several years. Fourteen had been delivered by April 1968; 7 more are on order. It is assumed the Danish-made training vessels will emphasize fishing gear and techniques.

The training for fish processors will begin aboard a recently launched, diesel-powered, refrigerated fish carrier of 9,000-displacement tons built in a Soviet shipyard. The carrier is equipped with laboratories and classrooms to train fish-processors, vessel navigators, and engine mechanics. ("Moscow News," Apr. 13, 1968.)

USSR (Contd.):

"Learning While Working"

The Soviets always have been strongly inclined toward "learning while working." Under Khrushchev, each student had to spend some time working as an industrial or agricultural laborer. Apparently, the Soviets have decided to go into high-seas fishermen's training on a large scale. This also may help the Soviets, conveniently and relatively inexpensively, to train the fishermen of foreign countries to which the USSR sells fishing vessels or extends technical assistance.

* * *

SPACE SATELLITES WILL BE USED TO AID FISHING AND STUDY OCEANS

On March 27, 1968, "Izvestiia," the Soviet Government's official organ, discussed the practical uses of Soviet spacecraft. It mentioned surveys of ice formations, warnings of coming storms, providing information for hydrometeorological services, and other uses.

The article mentions sputniks as being of use to the fishing fleets: "Kosmos-206" already has transmitted to earth data on severe cyclones in the Indian and Atlantic Oceans. Such information is used successfully in plotting a vessel's course. The sputniks also help to select the optimal course for many Soviet fishing and merchant vessels; this permits each vessel to save 5-7 percent of trip time. It affects substantially the economics of vessel operations.

Spacecraft Oceanography Grows

The article was coauthored by the First Deputy of the Soviet Hydrometeorological Service and a Soviet professor. It added to information from another Soviet source that referred to the use of spacecraft oceanography: "Oceanographers help Soviet fishermen and others who exploit marine resources by using the latest equipment--earth satellites and aircraft. Much oceanographic research can be done from space. A plane carrying various instruments--a flying marine hydrometeorological observatory--can do much research. It can take surface temperatures and compile a map of various marine environments; waves can be measured directly from the plane and entered into a map of wave patterns, etc. The greatest advantage in doing this research is the speed with which it can be passed on to users--fishermen and merchant seamen."

Research at Leningrad

The work on Soviet spacecraft oceanography is being done by the Leningrad Branch of the Soviet Institute of Oceanography. N. N. Makarenko heads the Laboratory of Aerooceanography. Although some instruments of the Soviet marine hydrometeorological observatory have been in use for years, it will be another 2-3 years before all the instruments will be installed aboard the observatory and be operational.

* * *

PURSE SEINING OFF U. S. COAST BEGINS

During April 1968 surveillance flights, at least 9 Soviet medium trawlers were sighted south of Long Island (N. Y.) and Block Island (R. I.) in the Northwest Atlantic fully equipped for purse seining. Power blocks and huge seine nets were observed on the stern of each vessel.

In early April, BCF resources management agents aboard a Coast Guard patrol vessel reported sighting a Soviet seiner; this is the first time a seiner was sighted off the U. S. coast and indicates the Soviets are beginning purse seining (for herring) on a bigger scale. By the end of April, 7 Soviet vessels were sighted seining for herring.

Conversions to Purse Seining

The Soviets have been converting medium trawlers for purse seining for more than 1 year. Most work was done in the Kaliningrad Region; ATLANTNIRO and other technical fishery institutes had a major part in developing gear techniques. In the Western Fisheries Administration, close to 100 medium trawlers already have been converted to purse seining--but most fish in the Norwegian Sea, North Sea, and other Northeast Atlantic fishing grounds. According to the Soviets, purse seining is twice as economical as pelagic trawling, mostly because of higher catches by the same number of fishermen.

* * *

USSR (Contd.):

PARTY PAPER CARRIES CRITICISM OF FISHERIES MINISTRY

The organ of the Central Committee of the Soviet Communist Party has published an attack on the Ministry of Fisheries and other ministries. The attack was made by I. Dudenko, the Party Secretary for the Astrakhan Region. He accused several ministers of responsibility for the sad state of affairs in the Caspian fisheries.

Dudenko reported that catch plans for the famous "kilka" (Caspian sprat) had been set, "on the basis of recommendations of scientific organizations," at not over 300,000-320,000 metric tons annually. Despite this, the Ministry of Fisheries in July 1966 changed the 5-year plan. Without sufficient evidence, it increased the catch plan to 400,000 tons. Dudenko implied political expediency was responsible for the change.

Volga Sturgeon Hurt

The article also accused the Ministry for Electric Power of having constructed the giant Volgograd (formerly Stalingrad) Hydroelectric Power Plant without regard for sturgeon-spawning areas in the Lower Volga. As a result, naturally spawning schools have shrunk to only about 20 percent of their former numbers. The shore line of the Caspian Sea has advanced up to 25-30 kilometers in the sea, and the level of water surface has decreased by 2.5 meters.

Volga Pollution

Pollution of the Volga River is another gigantic problem. Dudenko quoted estimates of the annual dumping into the Volga of 200,000 metric tons of crude oil wastes--and about 400,000 tons of acid wastes and other chemicals. Apparently, this is being done despite stringent Soviet regulations against pollutants.

Finally, the Ministry of Fisheries was accused of being so partial to high-seas fisheries expansion that it neglects problems at home in inland fisheries. The Black, Caspian, and Aral Seas, and Baikal Lake form part of these fisheries. ("Ekonomicheskaia Gazeta," Mar. 1968.)

Sholokhov Attacked Ishkov

During the 23rd Party Congress in 1966, Mikhail Sholokhov, Nobel prizewinner in literature, held Ishkov responsible for the destruction of Black Sea fishery resources.

Undoubtedly, the Ministry of Fisheries is under pressure by conservationists, some politically well connected, to begin paying attention to the severe problems in inland seas, lakes, and rivers.

* * *

KING CRAB FISHERY IN EASTERN BERING SEA ENDS

The second of the 2 Soviet king crab fleets departed the eastern Bering Sea on May 2, ending the 1968 crab season. The fleet commander aboard the shrimp mothership "Aleksandr Kosarev" notified U. S. authorities of the departure.

Originally, the Soviets intended to fish until June 1968. But, in early April, when a U.S. Bureau of Commercial Fisheries Resource Management Agent boarded 2 motherships, he was informed that fishing was poor and the 2 fleets might leave before June.

The Soviets fished king crab in the eastern Bering Sea from April to July during the 1960/1964 seasons; in 1965, from April to June; and in 1966/67, from March to June.

The 1968 season was the shortest Soviet Bering Sea king crab season--2 instead of the traditional 3 months. Also it was one with the least effort--2 instead of the usual 3 fleets.

The 1967 Season

In 1967, the Soviets produced 68,590 cases of king crab (each case of 48 $\frac{1}{2}$-lb. cans). This was only 68.6 percent of the annual quota of 100,000 cases allowed under the U. S.-USSR King Crab Agreement of 1967.

A greater number of tangle-nets was set in 1967: 657,000 against 617,000 in 1966. Despite this, the pack was 33.6 percent less than in 1966, when 104,654 cases were produced, about 12 percent below the year's quota of 118,600 cases.

* * *

USSR (Contd.):

NEW TUNA EXPLORATORY VESSEL

To help its tuna fleets find fish, the Soviet Ministry of Fisheries has added to the Pacific fleet an exploratory and research vessel specifically equipped for tuna scouting.

This vessel, the "Matros," was built in Kiev Shipyard and belongs to the Far Eastern Fisheries Administration. Home port is Vladivostok. Her first voyage will be to the Indian Ocean.

Kiev Shipyard builds medium freezer trawlers of the 700-gross-ton "Maiak" class. Several of these vessels are used for exploratory and research work.

* * *

NEW FISHERIES TRAINING VESSEL LAUNCHED

On April 30, the Burmeister & Wain's Shipyard in Copenhagen, Denmark, launched the "Kompas" stern freezer trawler for Sudoimport of Moscow, the Soviet vessel-import firm.

The vessel is the 15th in a series of virtually identical vessels for the same owners. The Kompas is like its sistership, the "Pelengator," launched in September 1967. It differs from other vessels of this class by having sleeping quarters and educational facilities for fishery trainees. The Kompas can accommodate 182 persons, including about 110 apprentices.

The vessel's main features are:

Length o.a.	102.7 meters
Length b.p.	91 "
Breadth	16 "
Depth to second deck	8.6 "
Deadweight	2,520 metric tons
Draught	5.6 meters
Speed on loaded trials	14 knots

Classrooms and Library

Two classrooms for navigation and radio instruction are on the boat deck. On the third deck, forward, a classroom for general instruction in fishery subjects will hold 25 apprentices. A library also will be provided.

The apprentices will be accommodated in common rooms, the largest having berths for 18 men.

The Rigging

The rigging consists of 2 pairs of self-supporting derrick posts. The foremost pair is provided with a top mast and a self-supporting, combined, signal and radar mast.

There are four 3-ton and two 7-ton derricks. These are served by four 3-ton and two 5-ton winches. The deck machinery includes one anchor winch, two 3-ton warping winches, and one 15-ton trawl winch. All winches are hydraulic.

The navigational equipment is the newest type. (Burmeister & Wain.)

* * *

SCIENTISTS LINK SAURY MIGRATIONS TO CYCLONE ACTIVITY

TINRO scientists in Vladivostok are studying the relationship between saury migrations and the activity of cyclones in the North and South Pacific. They noticed that when summer cyclones are intense over the Sea of Okhotsk, saury appear early in the traditional schooling areas. When cyclone activity is intense over the South Pacific, they are "late." Saury also are believed to approach earlier when the ocean's surface layers are warmer; this is a phenomenon closely associated with cyclone activity over the Pacific.

On the basis of these findings, it was possible to forecast saury Pacific fishing 2 months in advance, particularly off the Kuril Islands. ("Tass," April 4, 1968.)

Study Herring in N. Atlantic

Similar studies involving herring are underway in the North Atlantic. There, a relationship between cyclones and the position of herring schools with respect to water surface has been found. With low atmospheric pressure, the herring dive to greater depths; with high pressure, they come closer to the surface. ("Rybnoe Khoziaistvo," April 1968.)

* * *

RESEARCH VESSEL VISITS IVORY COAST

On April 21, the Soviet 6,829-displacement-ton oceanographic vessel "Akademik Kurchatov" visited Abidjan, Ivory Coast. The vessel is conducting complex oceanographic studies in the southeast Atlantic between 5° and 23° south latitude for 3½ months.

USSR (Contd.):

During its 4-day stay in Abidjan, she was open to the public for 3 hours each day. Professors from Abidjan University and Ivory Coast Government officials also visited. ("Fraternité-Matin," Abidjan, Apr. 25, 1968.)

United Kingdom

SEEKS TO EXPORT
FISHERY TECHNIQUES

The United Kingdom is seeking to export its technical fisheries knowledge in shipbuilding, engineering, and contracting industries. This means strictly business propositions to interested foreign firms or countries.

The White Fish Authority is embarking on a worldwide publicity program to stimulate business for U. K. firms in these and other aspects of the fishing industry by assisting in the fisheries development of other nations. (U. S. Embassy, London, Mar. 23, 1968.)

* * *

QUEEN SCALLOPS SHIPPED TO U. S.

A shellfish firm in the United Kingdom shipped 5 tons of queen scallops (Chlamys opercularis) to the U. S. early in April. Queen scallops are small scallops found over many areas of the west coast of the U. K. They were not commercialized previously.

The British firm believes that if quality can be maintained in the trans-Atlantic sea shipments, its sales of queen scallops could earn a half-million dollars. ("Fishing News," Apr. 5, 1968.)

* * *

WHITE FISH AUTHORITY
RAISES INTEREST ON LOANS

The White Fish Authority announced higher interest rates starting April 1, 1968. The Authority explained that these rates resulted from higher interest rates charged it by the Treasury.

Fishing vessels, new engines, nets and gear:

On loans not over 5 years: $8\frac{1}{8}$ percent, increase $\frac{1}{8}$ percent.

On loans over 5 years, but not over 10 years: 8 percent, no change.

On loans over 10 years, but not more than 15 years: $7\frac{7}{8}$ percent, decrease $\frac{1}{8}$ percent.

On loans over 15 years, but not more than 20 years: $7\frac{7}{8}$ percent, no change.

Processing plants: On loans not over 15 years: $8\frac{1}{2}$ percent, increase $\frac{1}{8}$ percent.

On loans over 15 years, but not over 20 years: $8\frac{1}{2}$ percent, increase $\frac{1}{4}$ percent.

The rates on advances made before April 1 remained the same. ("The Fish Trades Gazette," Apr. 13, 1968.)

* * *

FISHERMEN PRESS NEW
FOREIGN LANDINGS BAN

Fishermen's organizations in Grimsby, England, are trying to counter the worst crisis ever faced by British fisheries. Some trawlers have been laid up for a long period; older trawlers are being sold for scrap. If present trends continue, 2,000 fishermen will be unemployed by the end of summer.

Grimsby organizations are preparing a proposal for government assistance and a ban on foreign landings. Support is expected from other fishing ports. Foreign landings are termed "dumping." Many believe that foreigners can land fish in Britain only because their governments subsidize them heavily.

Danes Would Suffer

Danish fishermen would be among hardest hit by a ban--just as they were by unofficial landing restrictions imposed by British trawler-owners in Aug. and Sept. 1967. They protest that, contrary to British opinion, Danish fisheries receive no government subsidy. They contend that the high quality of their cod landed is responsible for excellent demand for cod in British markets.

United Kingdom (Contd.):

Official restriction of foreign landings would run counter to current British policy. This favors free trade in fish products because the domestic industry cannot meet demand. The Danes speculate, however, that British trawler owners who control unloading at some ports are prepared to impose "private" restrictions as in 1967. (Regional Fisheries Attaché, U. S. Embassy, Copenhagen, May 7.)

* * *

SUMMARY OF 1967
MARINE OIL SITUATION

Because of the comparative cheapness of marine oils in 1967, imports and use of these oils in the United Kingdom increased considerably. Total imports of marine oils rose almost 60 percent--to 281,900 long tons. However, disposals of marine oils during 1967 did not rise so much. These totaled 226,200 tons, or 13 percent above 1966. As a result of the heavy imports, stocks of marine oils at the end of 1967 reached the very high level of 67,300 tons; it was 28,200 tons a year earlier.

Price Falls Steadily

During 1967, the price of fish oil declined steadily between June and December. It dropped from US$142 per long ton for Peruvian fish oil in June to $103 in December. At the same time in 1966, Peruvian fish oil was $179. By April 1968, the price was way down to $93. The latest quotations for July-August shipments to Rotterdam are $92 a metric ton c.i.f.

U. K. Stocks, Supplies, and Disposals of Crude Marine Oils, 1966-67

	1967	1966
	. . (1,000 Long Tons) . .	
Stocks, Jan. 1	28.2	53.3
Imports	281.9	177.8
Total	310.1	231.1
Disposals	226.2	200.5
Stocks, Dec. 31	67.3	28.2
Total	293.5	228.7
Balancing item	+16.6	+2.4

(Ministry of Agriculture, "Monthly Digest of Statistics," "Overseas Trade Accounts of the United Kingdom.")

It is reported that large U.K. consumers have bought 16,000 tons of whale oil from this season's catch at $103.20 a ton c.i.f.--compared with $144 per ton paid for 34,500 tons last year. The purchase was made up of 8,000 tons of Soviet and 8,000 tons of Japanese oil. (U. S. Embassy, London, April 19, 1968.)

France

PLANT TO PRODUCE PROTEIN
FROM PETROLEUM PRODUCTS

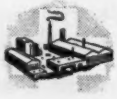
A commercial plant to extract protein concentrate from petroleum products is being built at the Lavera refinery in France. It will be operated by British Petroleum of France and is expected to produce 16,000 tons of protein a year by 1970.

Despite all efforts to produce animal protein, says the firm's French research director, the development of only present animal resources would leave a shortage of 10 million tons by 1980 and 22 million tons by the year 2000. Protein production from petroleum should be carefully considered, he suggests.

World Crude Petroleum Output

World production of crude petroleum in 1966 was reported as 1.5 billion tons, about 90 percent paraffinic. Certain paraffins, combined with ammonia, phosphate, and trace metals, are used as a food for yeast. This grows by fermentation into a sufficient mass to be used as livestock feed.

According to the research director, this process represents a potential production of 20 million tons of protein from 40 to 50 million tons of paraffins. ("Science News," Apr. 1968.)



Sweden

TO BUILD MORE FISH CARRIERS FOR USSR

Several large orders were placed by Soviet import agencies in Sweden during March 1968. The largest was placed by SUDOIMPORT of Moscow with the Lindholmen shipyard in Gotoborg--for 2 refrigerated fish carriers worth $11-13 million. The cost depends on type of auxiliary equipment to be selected later.

This contract was signed in Moscow on March 14. It supplements a Soviet contract for 6 similar ships awarded Lindholmen in December 1967. All 8 refrigerator vessels are scheduled for delivery before the end of 1970. They are worth almost $50 million.

Perhaps Largest Order

Reportedly, this is the largest order ever booked with Lindholmen. It is expected to secure full employment there at least through 1970. All 8 ships will be powered by "Pielstick" engines of advanced design and equipped with controllable pitch propellers. Some electronic appliances, deck machinery, and galley equipment will be supplied by the USSR.

The vessels will transport frozen fish from Soviet fishing fleets at sea to ports in the USSR. They will contain 12,500 cubic meters of refrigerated space. (U. S. Embassy, Stockholm, Mar. 25, 1968.)

Norway

FISH MEAL PRODUCTION TO BE LOWER IN 1968

The 1968 winter herring catch was only 25,600 metric tons--compared with 371,600 tons in 1967. Until a few years ago, the fishery had been No. 1 in volume.

This worst catch since 1889 was due partly to foul weather on the west coast of Norway and partly to sea temperatures that caused the herring shoals to stay below the reach of purse seines. At the end of March, the total catch of all herring species was 39,800 tons, 9.4 percent of the 1967 catch.

Record Catches of Capelin

The failure of the herring fisheries was offset to some extent by record catches of capelin off the coast of Finnmark. The fishery, which ended shortly after Easter, yielded an estimated 485,000 tons, or 20 percent above 1967.

Reduction Plant Output To Drop

There is reason to believe that the output of the reduction plants will be reduced substantially from 1967's record 470,000 tons of fish meal and 310,000 tons of fish oil. The small supplies of high-fat winter herring, combined with a lower-fat capelin this year than in 1967, further indicate that 1968 fish-oil production will decline proportionally more than fish meal.

High Yields Needed

Norsildmel, the joint sales organization of the fish-reduction industry, has sold 300,000 tons of fish meal for 1968 delivery. The 1967 production had been sold before the end of 1967, partly for delivery during the first-quarter 1968. Norsildmel has met all commitments so far this year. But completion of outstanding orders will depend on successful fisheries--notably high yields of North Sea herring and/or mackerel during the rest of 1968.

A possible effect of the winter herring failure could be reduced Norwegian exports to Eastern Europe--where herring meal is preferred over fish meal made from other species. (U. S. Embassy, Oslo, April 17, 1968.)

* * *

EXPORTS IN FIRST-QUARTER 1968 REPORTED

Norway's fishery-product exports for January-March 1968 were reported on April 25 by "Fiskets Gang," published by the Fishery Directorate:

Frozen Fillets: Exports increased about 14 percent over the 1967 period. Shipments of herring and cod fillets increased significantly.

Canned Fish: Exports were 7,400 metric tons, slightly below comparable 1967 ship-

Norway (Contd.):

ments. Exports of small sild sardines were up about 13 percent; brisling shipments fell 16 percent. The main canning season for brisling and sild sardines begins in spring.

Industrial Fish: Exports rose 15 percent from 1967 period. The large stocks at the start of 1967 contributed to the gain because herring meal production has been extremely low this year.

Product	Jan.-Mar.	
	1968	1967
	. . . (Metric Tons) . . .	
Frozen fillets:		
Haddock	3,079	1,536
Cod	8,520	5,146
Coalfish	5,094	7,152
Herring	1,284	1,956
Other	1,518	1,278
Total frozen fillets	19,495	17,068
Frozen herring	1,682	3,997
Canned fishery products:		
Brisling	1,325	1,584
Small sild sardines	4,285	3,779
Kippers	696	830
Shellfish	131	149
Other	967	1,111
Total canned fish	7,404	7,453
Fish meal	133,138	115,250
Herring oil, crude	21,788	13,573

* * *

FIRM PRODUCES LOW-FAT, HIGH-PROTEIN FISH MEAL

A/S Nimrod of Egersund, Norway, began production March 15 of low-fat, high-protein, fish meal. The production is based on gasoline extraction of the fat contents of fish meal. This yields a product with a minimum fat content of 0.3 percent and a maximum protein percentage of 88.

The company, situated in Norway's principal fishing port, should be assured ample supplies of raw fish for its planned annual output of 15,000 metric tons of pelletized meal.

Acceptable for Humans

Most of the production will be marketed as feeding stuff for animals which cannot be fed conventional high-fat fish meal--mink and livestock in months prior to slaughtering. The almost tasteless and colorless Nimrod fish meal also has proved fully acceptable for human consumption. This indicates marketing possibilities in the food industry: low-cost protein enrichment of sausages and fish soups.

Nimrod Is 2nd Plant

A/S Nimrod is the second Norwegian fat extraction plant for fish meal. The first, a 10,000- to 12,000-metric ton capacity plant, was installed at Kopervik Sildeoljefabrikk, Kopervik in 1967. (U. S. Embassy, Oslo, Mar. 22, 1968.)

* * *

LATEST EQUIPMENT USED TO SPUR FISH INDUSTRY GROWTH

Norway's fishing industry has had 4 exceptionally good years. Record catches were landed each year after 1962, and the rate of increase in landings was greater than ever before. Landings totaled 1.4 million metric tons in 1962, 2.1 million tons in 1965, and 2.6 million tons in 1966. In 1967, a substantial boost occurred: fishermen supplied processing plants ashore with more than 3 million tons of fish. Norway won fifth place among the world's fishing nations.

The main factors in this achievement were the exceptional amount of fish on the traditional fishing grounds, the generally favorable conditions for fishing, and the use of efficient methods to find and catch fish.

Efficiency Promoted

During the past few years, a great effort has been made in Norway to promote fishing efficiency. Modern methods have been developed and new gear introduced. A 2-way effect has been observed: The good fishing years have encouraged industry to concentrate talent and energy on developing and marketing new gear; this in turn has greatly increased catches--to the benefit of fishermen and the processing industry ashore.

Many companies have specialized in advanced equipment for the fleet. Norwegian electronic fish-finding devices have met with considerable approval abroad.

Many companies have realized the great importance of vessel maneuverability. They are manufacturing steering propellers--bow or stern thrusters, or the so-called active rudders. Such equipment is now mounted on a growing number of Norwegian and foreign vessels, either fore or astern, or both.

Norway (Contd.):

Improved Fishing Operations

The whole purse-seining operation is guided from the vessel's deck. The power block does the rest; it hauls in far greater quantities in one operation and in less time than manpower did some years ago. Today's big steel purse seiners or trawlers, some even equipped with stabilizers, can fish in weather that was forbidding before.

Resulting directly from such efficient equipment have been North Sea herring and mackerel seasons that rightly were called stupendous adventures.

There are fishing techniques other than purse seining. Net fishing and jig fishing are important for their purposes.

Line fishing has experienced a near revolution after a line-fishing machine was introduced. The machine automatically performs the line's movements upwards and downwards to required depths and speed.

Fishermen also are very interested in trawling. (Export Council of Norway, Apr. 1968.)

Denmark

HOLDS SUCCESSFUL
INTERNATIONAL TRADE FAIR

The sixth International Fisheries Trade Fair was visited by 50,000 people during April 24-May 5. Billed as the largest fair ever held in Europe, it was synchronized with the 100-year jubilee of Esbjerg Harbor.

Products of 250 firms from 13 nations were set up in the new 9,000-square yard auction hall next to the fishing harbor. New vessels produced in East German, Norwegian, and Danish yards were displayed. The exhibit of the Polish import-export agency CENTROMOR included models of their latest trawler designs. Also, the fair displayed processing, handling, and packaging equipment and supplies.

New Fisheries Museum

A special feature was the grand opening of the US$1.7 million Esbjerg fisheries museum. The main attraction was a fully restored 150-year-old fishing boat discovered a year ago beneath tons of beach sand north of Esbjerg. The boat is the type used along Denmark's North Sea coast for centuries. Besides historical displays, the museum shows the operation of modern fishing gear and electronic equipment and North Sea species. There is also laboratory and office space for the Danish Geographic Institute and Denmark's Fisheries and Marine Investigations. (U. S. Embassy, Copenhagen, May 7, 1968.)

* * *

GREENLAND'S FISHERIES
ARE IN TROUBLE

The Director of the Royal Greenland Trade Department (RGTD) raised storm warnings for the future of the fisheries at RGTD's annual fisheries meeting in Copenhagen in April. Difficulties face virtually all areas of this major industry. However, there appears no alternative to development of the fisheries as the foundation of Greenland's economy. The Danish Government, he said, must continue to bear the greatest part of the initiative and the larger risks. But he hoped private industry also will continue to assist in the development.

The value of fish purchases during 1967 was almost unchanged from 1966: the RGTD bought raw material worth US$2.6 million, and the private companies bought raw material worth US$1 million.

Cod Fishery Down 6%

The cod fishery, concentrated in May through September, was down 6 percent. The year's smallest cod catches were taken in February, March, and April; results were even poorer than in the 1966 period. This trend continued into spring 1968. The strong seasonality of the cod fishery makes it impossible to secure satisfactory use of processing plant capacity.

Catches of sea catfish (wolffish) increased 9 percent, salmon 2 percent, and shrimp 5 percent. Landings of Greenland halibut declined.

Denmark (Contd.):

New Trawlers in 1969

Catches of the 4 large long-line vessels introduced into the Greenland fisheries by the Government during 1965 and 1966 were down 16 percent in 1967 from 1966. The first of a new series of stern trawlers will be introduced in 1969. It is hoped each new vessel will attain an annual catch of 4,000 to 5,000 metric tons. If this goal is reached, the overall operation of the Greenland fishing industry should become profitable.

Private Firm Loses

The private company, Godthaab Fiskenindustri, lost US$115,000 during 1967; it had earned US$133,000 in 1966. Its raw material purchases were down 10 percent. Losses occurred on its fish meal plant designed primarily for industrial fish--which were in short supply. US$40,000 now is being spent to modify the plant.

Outlook Dim

The RGTD director described to Godthaab Fiskenindustri officials the dim outlook for Greenland fishing. He said the U.S. price of 23 cents a pound for cod blocks was slightly under the cost of production. The Greenland salmon fishery was threatened by overproduction and the resulting price declines. (Regional Fisheries Attaché, U.S. Embassy, Copenhagen, Apr. 26, 1968.)

* * *

SALMON CAUGHT NEAR FAROE ISLANDS

The Faroese research vessel "Jens Christian Svabo" has found salmon 30 to 50 miles northeast of the Faroese Island of Fugloy. Salmon previously were not known to occur near the Faroes. Current prices are high.

Using a 600-hook longline, the research vessel took 150 salmon in 2 days. Newspaper reports of this success were quick to point out how profitable the Faroese salmon fishery off the west coast of Greenland has been in recent years. (Regional Fisheries Attaché, U. S. Embassy, Copenhagen, Apr. 26, 1968.)

Iceland

EXPORT LEVIES RAISED ON FISHERY PRODUCTS

The Althing (Parliament) approved during the week of Apr. 14, 1968, a bill to amend the 1966 Act on Export Levies on Fishery Products. It increases export levies on uncured salted fish, frozen lobster, capelin oil and meal, and salted herring.

The levy on salted herring was increased from 6 percent of f.o.b. value to 10 percent. Levies on the other fishery products were increased from 530 kronur (IKr. 57 = US$1) per ton to 3.5 percent of f.o.b. value.

Although the increased levy also applies to capelin oil and meal, capelin products are being exempted temporarily from any export levy. Industry has protested the increased rate on salted herring.

The bulk of the increase in export revenue will be allocated to the fishing vessel insurance fund, which has experienced deficits in 1967 and 1968. (U. S. Embassy, Reykjavik, April. 25, 1968.)

* * *

TRIES TO DEPEND LESS ON HERRING

Iceland is trying to lessen its overreliance on herring in recent years. The migrations of herring are highly unpredictable, and the catch is less valuable than cod. So more attention is being paid to the more valuable cod. The cod catch declined by 18.7 percent in 1966 and 22.8 percent in 1967. In April 1968, white fish catches, including cod, were favorable. It is hoped that cod catches will recover to the 1966 level of about 339,000 metric tons.

Weather Hinders Fishing

Very bad weather hindered the fishing industry early in 1968. The outlook for the herring catch will not be discernible until August; the winter season was poor. The herring catch in 1967 fell one-third from 1966.

Government Helps

The fish-processing industry, with its high costs and overinvestment, is being helped by Government subsidies. These are designed to encourage structural rationalization of the

Iceland (Contd.):

industry. A price equalization fund is designed to offset fluctuations in export prices. A few inefficient plants have closed.

The supply of raw material to processing plants is uncertain. Another factor to watch will be the direction of demand for and export prices of processed products. In 1967, export prices for herring oil fell 20 percent, herring meal 15 percent, and frozen fish fillets 16 percent. Frozen fish prices have improved only slightly over their earlier lows of this year. Fish meal is still low. Fish oil is at an all-time low. (U.S. Embassy, Reykjavik, May 9, 1968.)

Poland

TRAWLER COLLIDES
WITH U. S. TANKER

In late evening of May 18, 1968, during a storm, the Polish stern trawler "Barwena" (1,370 gross tons) collided with the U.S. tanker "Texaco, Illinois" 77 miles (39° N. and 73° W.) off Cape May, New Jersey. Barwena's hull was split by a 100-foot-long gash. Because her escaping fuel (capacity over 300 metric tons) made her lighter, she made it to Philadelphia. Three crew members were hospitalized with light injuries. The Barwena had left Halifax, Canada, on May 7. The U.S. tanker was not damaged seriously.

Barwena's Catch

During a surveillance flight by the U.S. Bureau of Commercial Fisheries on May 17, 1968, the Barwena was sighted 55 miles southeast of Long Beach Island off New Jersey. This was not far from her position a day later when she collided. She was fishing for mackerel and herring. About 100 metric tons of processed products (frozen fillets and fish meal) were obtained in about 1 week. Two other Polish stern trawlers and 6 side trawlers, 1 East German, and 3 Soviet fishing vessels were sighted nearby.

Yugoslavia

DOCUMENTARY ON "FISHERMEN
OF TACOMA" PLANNED

In cooperation with the U. S. Information Agency (USIA), the Yugoslav television system plans to make a documentary film on the fishermen of Washington State. The subject will be the Yugoslavs who migrated to the U. S. and are now Pacific fishermen.

The Yugoslav TV team will shoot scenes of fish-catching techniques, vessels, and distribution from ocean to markets.

VORACIOUS IMPORTED SNAILS CLEAR U. S. LAKES

Two kinds of voracious fresh water snails from South American rivers are clearing United States lakes by devouring submerged weeds such as elodea, southern niad, coontail, pondweed and certain algae. Marisa, a native of Colombia and Venezuela, can tolerate highly polluted water. It would have to be restricted in certain areas of the world, however, for it also devours rice, watercress and water chestnut. The other weed-eating snail, Pomacea australia, from Brazil, can survive colder climates than Marisa, and eats aquatic plants even more vigorously.

According to researchers of the U. S. Department of Agriculture's Research Station at Fort Lauderdale, Florida, three ponds in southern Florida were stocked in 1965 with hardy Marisa cornuarietis snails--8,000 snails per acre. One year later, the ponds were free of submerged weeds and continued clear. (Reprinted with permission from "Science News," weekly summary of current science, copyrighted 1966 by Science Service, Inc.)

LATIN AMERICA

Peru

FISH MEAL CONSORTIUM TO BEGIN BULK SHIPMENTS

Bulk shipments of fish meal were scheduled to begin in April 1968, according to the Peruvian fish meal Consortium. The first shipment by chartered vessel would be about 12,000 metric tons. Plans call for 120,000 tons to be shipped this year, with costs reduced by $7 a ton.

The Consortium, together with California Pellet Meal Co. and Monsanto, began shipments of bulk pelletized meal in 1963. Shipments were stopped due to the critical industry situation at that time. Apparently, the Consortium was spurred by plans of Pesquera Delphin to begin pelletized fish meal shipments. It is beginning bulk shipments to stay in the running. Plans are for bulk meal to be transported in metal cylinders from factory to launches, ferried out, and dumped directly into the holds of transport vessels.

* * *

REPORT ON FISH MEAL INDUSTRY

On April 24, 1968, the Peruvian Government set the anchovy catch limit for the 1967/68 season at 9.5 million metric tons. It announced the season's closing date as May 31. It was estimated that this catch might produce close to 1.7 million tons of fish meal.

Shipments in the first quarter were good but may have slowed in April. Stocks continue high. Fish oil production was good in the first quarter. Fishing generally has been good, although heavy fog in certain areas along coast has hampered fishing.

1967/68 Anchovy Season

At the rate of fishing in early May, it was predicted that the 9.5-million-ton-mark might be reached before May 31. The government did not state whether the tonnage limit or date was the crucial factor.

Production

Fish meal production from Sept. 1, 1967, to March 31, 1968, was 1,416,347 metric tons. The additional authorized catch of 1.5 million tons of catch could add roughly 270,000 tons of fish meal. This would bring season's total close to 1.7 million tons.

Shipments

In 1967, fish meal shipments were 1,560,900 metric tons. For the fishing season that opened Sept. 1, 1967, shipments reached 1,098,788 tons on March 31. Shipments, which were very good in first-quarter 1968, slowed during April.

Stocks

During the closed season (Feb. 17 to March 17, 1968) stocks were drawn down but began to rise when fishing resumed. Stocks on Jan. 30 were 688,943 tons; on Feb. 29, 689,039; on Mar. 31, 671,323. Stocks on May 31, 1968, were expected to be well over 700,000 tons. However, June, July, and August will be closed for fishing; September usually is a poor month for fishing; so even moderate shipments during this period should draw down stocks to comparatively low levels by the time fishing hits its stride about October 1.

Sales by Marketing Zones

Fish meal sales by marketing zones for first-quarter 1968 show a marked increase in sales and important changes in the percentage distribution of these sales by zones.

	1968		1967	
	1st Qtr.	%	1st Qtr.	%
U.S.A. & Canada. . .	132,645	24.1	112,564	33.8
Latin America. . . .	31,455	5.7	14,600	4.4
Far East.	52,040	9.4	10,827	3.2
Eastern Europe	87,820	16.0	66,077	19.8
Western Europe	134,186	24.4	76,483	23.0
West Germany	112,239	20.4	52,685	15.8
Total.	550,385	100	333,236	100

Exports of Semirefined Fish Oil

In first-quarter 1968, 46,137 metric tons of semirefined fish oil were exported--to West Germany, 13%; Colombia, 11.1%; Denmark, 9.2%; Ecuador, 0.7%; The Netherlands, 63.4%; and Great Britain, 2.6%.

Exports of Crude Fish Oil

During the first three months of 1968, 40,817 metric tons of crude fish oil were exported. The Netherlands took 58.7 percent; Germany was second, 36.1 percent. (U. S. Embassy, Lima, May 2, 1968.)

Brazil

FISHING INDUSTRY PROTESTS SOVIET FISHING OFF BRAZIL

On April 9, two Brazilian shrimp trawlers fishing off Sao Francisco Island in southern Brazil, south of Sao Paulo, were "interfered with" by Soviet fishing vessels. Companhia Brazileira de Pesca, which owns the trawlers, protested to the Brazilian Air Force, Navy, and Ministry of Foreign Affairs.

At the same time, the company asked the Sao Paulo Federation of Industries to support its protest and request that the government organize better surveillance of "Brazilian territorial waters" to protect fishery resources. At an April 18 meeting of the Federation's Board of Directors, it was decided to bring "the gravity of the incident to the attention of competent Brazilian authorities." (U. S. Consulate, Sao Paulo, Apr. 23, 1968.)

* * *

PUSHES DEVELOPMENT OF FISHERIES

In the 10 months of its existence, the government has approved 42 projects involving US$12 million. This was announced in Sao Paulo by Admiral Antonio Maria Nunes de Souza, head of the Brazilian Fisheries Development Agency, Superintendencia do Desenvolvimento da Pesca--SUDEPE.

SUDEPE is going to acquire 4 fishing vessels equipped with echo-sounding and other modern fish-finding equipment to carry out research and locate fish off Brazil. The Admiral predicted that Brazil shortly would increase her annual catch of 150,000 metric tons to 400,000 tons through SUDEPE's efforts. By 1972, the annual catch would be about 2 million tons. Fishing industry projects already approved call for adding 110 vessels to the fishing fleet.

Predicts Progress

He declared that within a few years fish would become the basic source of protein for Brazilians. He predicted that within 2 to 3 years annual per-capita consumption would increase from the present 9.9 lbs. to 26 lbs.

Some businessmen appear interested in investment possibilities. However, they are realistic and critical. One Sao Paulo businessman asked the Admiral what sort of research is being done to determine the fish potential of Brazilian waters. He replied that such research was projected--but that Brazilians knew there was a great potential because they could see foreign vessels working off the coast. (U. S. Consul, Sao Paulo, Apr. 30, 1968.)

Chile

SOVIETS AID CHILE'S FISHERIES

Three Soviet technical fishery experts left Santiago in March 1968 after a month's study of the Chilean fishing industry. The visit was arranged under the January 1967 Soviet-Chilean Agreement. The Chilean press says technicians will submit reports to their respective governments on the results. The Soviet team is expected to recommend negotiation of a technical and research assistance agreement under which the Soviets might help develop Chilean fisheries. This would include aid in electrical fishing, exchange of scientific information, feasibility studies on how to improve existing, or construct new, fishing ports, and exchanges of fishery experts.

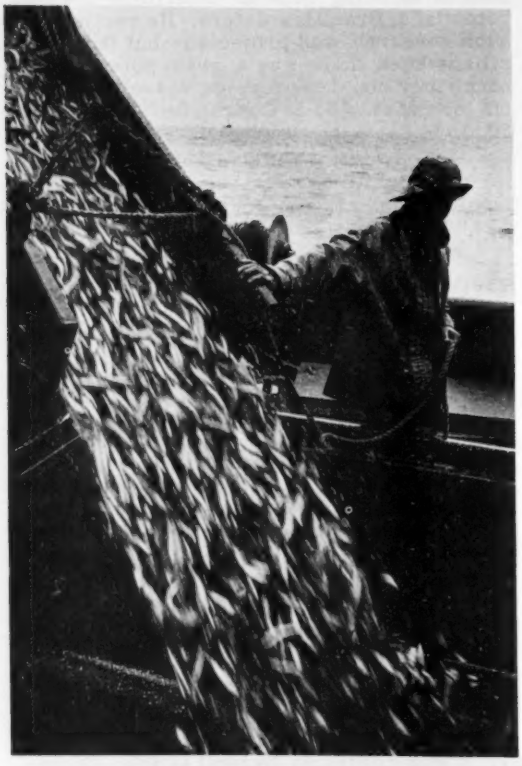
Several Agencies Involved

The Soviet team arrived in Santiago Feb. 27. It was headed by Evgenii Grinko, Director of the Moscow All-Union (Federal) Institute for Design and Construction Projects in the Fishing Industry. The sponsoring agency was the Fisheries Division of the Ministry of Agriculture. Its director participated in the FAO-sponsored Seminar on Fish Behavior in the USSR in October 1967.

The Fisheries Division arranged for contacts with other government agencies, primarily the Government Development Corporation, or CORFO, and with the Fisheries Development Institute, a Chile/FAO organization.

After meetings at Santiago, the Soviet team visited ports and adjacent processing plants in northern Chile (Antofagasta, Arica, etc.); the Golfo de Ancud in Central Chile (visited Ancud, Castro, Chonchi, Calbuco, and Puerto Montt fishery ports and plants); and the southernmost part of Chile where, at Punta Arenas, the "centolla" (king crab) industry was visited.

Chile (Contd.):



A rich catch of anchovies flows into hold of Iquique-based boat. The fish are abundant off Northern Chile and are converted into meal and oil for export. (Photo: R. Saunders/Scope)

Soviets Used Chilean Ports

During the team's visit, a Soviet fishery research vessel ("SRTM-8459") from the Pacific Institute for Fisheries and Oceanography arrived at Valparaiso. It was open to the public. Often in the past, the Soviets have used Valparaiso and Puerto Montt to resupply their oceanography and fishery research vessels operating in the southeastern Pacific and Antarctic.

2 Views of Soviet Intentions

Government officials imply that the Soviets may put money and technical assistance into a "centolla" cannery--and assist in enlarging some existing fish-processing plants and ports. However, the Santiago fishery trade and industry circles have a different opinion: They believe the main purpose of any Soviet aid would be to obtain permission to use Chilean ports as supply bases for Soviet fleets operating in southeastern Pacific; and, possibly, even to process and market catches (with Chilean permission) within the 200-mile fishing limits.

* * *

OUTPUT AND EXPORT OF FISH MEAL & OIL, WHALE MEAL & OIL

Chile's fish-meal production during 1967 was 163,369 metric tons, down 26.2 percent from 221,334 metric tons in 1966. About 123,752 metric tons of 1967 production, mainly anchovy meal, were produced in the north.

Production of fish oil in 1967 was 10,426 metric tons; 9,899 metric tons were produced in the north. Fish oil production decreased 53.9 percent from the 22,625 metric tons in 1966. Trade groups estimate whale and sperm oil production at about 7,200 metric tons, somewhat lower than 1966.

During 1967, 102,705 metric tons of fish meal worth US$12,026,058 were exported. As usual, the principal importers were the U.S., West Germany, and the Netherlands.

Whale and sperm oil production in 1967 was somewhat lower than 1966. (U. S. Embassy, Santiago, Apr. 15, 1968.)

Ecuador

SEEKS FINANCING TO MODERNIZE FISHING INDUSTRY

Ecuador's Planning Board will seek World Bank financing for the first stage of a 10-year plan to expand and modernize the fishing industry.

The first stage (5 years) includes: (a) construction of 12 purse-seine-type tuna vessels, presumably equipped with refrigeration, (b) location and feasibility studies for 2 fishing ports, and (c) construction of port facilities in Manta fishing port. The cost of the 12 vessels is estimated at US$3.3 million. Feasibility studies should cost $300,000, and construction $242,000. Also, technical assistance and training of crews will cost $327,000.

Ecuador (Contd.):

The First Stage

During the first stage, the Planning Board intends to act as promoter of the project with necessary assistance from the National Financing Corporation and the Ministry of Public Works.

The Corporation already has sent a representative to the U. S. to discuss with spokesmen from the American tuna industry possible use of purse-seiners in Ecuador. The first step probably would involve bringing U. S. flag vessels to Ecuador on a temporary basis for training purposes; the resulting catches would be sold to local processing plants.

The Second Stage

If the first stage proceeds successfully, the Planning Board intends to go ahead with an even more ambitious second stage. This calls for: (a) construction of another 12 purse-seiners, (b) acquisition of a fleet of trawlers and 2 lobster vessels, (c) renovation and modernization of existing fleet, (d) studies of planned fishing ports, and (e) construction of 2 fishing ports. The purse-seiners probably will cost the same as the first 12. Port construction will be $11.3 million, improvement of existing fleet $500,000, and purchase of 2 lobster boats $10,000. Final studies for a trawler fleet are incomplete; cost estimates are not available.

According to the Planning Board, the application to the World Bank for financing the first stage is being handled expeditiously. Bank spokesmen have said a loan contract could be signed in July or August 1968.

Argentina

SOVIET FLEET LEAVES ARGENTINE 200-MILE ZONE

On Apr. 1, 1968, the Soviet fishing fleets withdrew from the Patagonian Shelf waters claimed by Argentina--up to "200 miles from low tide"--in its Jan. 4, 1967, decree. On Nov. 24, 1967, Argentina made known her regulations for foreign fishing in the 200-mile zone: exorbitant fishing license fees (US$10 per each net registered ton every 4 months) and other restrictions.

Several Nations Negotiate

Japan, USSR, Brazil, Spain, and West Germany, which fished in the 200-mile zone, began to negotiate with Argentina about the new regulations. The latter delayed enforcement until April 1, 1968.

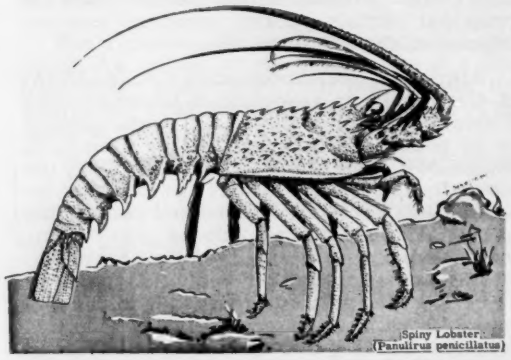
USSR Refuses to Pay

The months-long negotiations with the Soviet Union broke down when the Soviets refused to pay license fees. When Argentina finally began to enforce regulations, all Soviet fishing and support vessels withdrew north and east of the 200-mile limit.

Honduras

THE SPINY LOBSTER FISHERY

Three firms constitute the spiny lobster industry in Honduras: Alimentos Marinos Hondurenos, S.A. of Puerto Lempira, Department of Gracias a Dios; Industria Pesquera Hondurena of Guanaja, Bay Islands; and Caribbean Products Company, Santos Guardiola, Bay Islands.


Spiny Lobster (Panulirus penicillatus)

Exports for 1963-67 were:

Year	Lbs.	Value US$
1967 1/	21,142	5,602
1966	180,797	63,798
1965	310,404	117,237
1964	35,426	17,352
1963	30,941	12,700

1/ 9 mos. only.

Honduras (Contd.):

Catch data are unavailable, but it is estimated that over 90 percent is exported to the U. S., almost entirely frozen.

Data Scarce

Little information is available on the number of fishermen or vessels employed. Alimentos Marinos Hondurenos, S.A. reportedly has 11 vessels, 6 in operating condition.

Fishermen work the North Coast (Caribbean) regions of Honduras between Puerto Lempira, the Honduran Bay Islands, and the Swan Islands. The catch on the South Coast is insignificant.

The Tegucigalpa retail price for spiny lobster ranges from US$1.85 to $2.50 a pound. Prices are considerably lower in the North Coast-Bay Islands region. (U. S. Embassy, Tegucigalpa, May 9, 1968.)

Nicaragua

THE PACIFIC COAST FISHERIES

Shrimp fishing for export continues as the most important fishery on Nicaragua's Pacific Coast. Production has trebled since the principal shrimp packing company was reorganized about 2 years ago.

Alimentos Interamericanos, S.A. (ALINSA) of Corinto is an associate of Interamerican Foods, Inc., of Brownsville, Texas. Capital is 50 percent Nicaraguan, 50 percent U. S. Under new ownership and management, the plant, located on an excellent deep-water harbor, has been modernized and placed into full production. It has 2 docks, one for unloading and net repair, the other for icing, fueling, and servicing the boats. A conveyor carries the shrimp from dock to packing room, which is equipped with mechanical sorters. Peeling and deveining are done by hand. The modern freezer and cold storage are in the same building as the packing room and offices.

ALINSA's Fleet

The fleet fishing for ALINSA consists of 30 U. S. trawlers, most from Brownsville, Texas. Eighteen are company-owned and 12 are private boats belonging to 3 owners. Twenty are ice boats and 10 are equipped with brine refrigeration. Another fleet of 10 Panamanian vessels plans to operate seasonally at Corinto. The fishing grounds are close; at times, the trawlers can start fishing within a half hour of port. Ten-day trips are usual.

5-Lb. Boxes

Most ALINSA production is in 5-pound boxes, heads-off, shells-on. However, sizes smaller than 15 to the pound are packed, peeled, and deveined, individually quick frozen, when the market demands it--on orders from Brownsville.

Formerly, most production was shipped by refrigerated steamer to Houston. Following the long-delayed permission to transit Mexico, early in 1968, most shipments now are direct to Brownsville via refrigerated truck-trailers in 5 days.

Booth Builds Plant

Booth Nicaragua, S. A., which operates the largest shrimp plant on the Atlantic Coast, is beginning to build a modern prefabricated plant at San Juan del Sur. The fleet is being assembled; 4 boats were ordered in Mexico, 4 in the U. S., and more are to come.

Pacific Coast Shrimp Landings

	1967	1966	1965
	. . (1,000 Lbs. heads-off weight) . .		
Production:			
White	711	1,072	342
Brown	102	5	139
Pink	641	607	230
Sea-bobs, etc. . . .	460	348	2
Total	1,914	2,032	713
Fishing Effort:			
Avg. number boats fishing	28	18	12
Total boat-days of fishing	4,352	2,969	1,903

Pacific Coast shrimp production increased remarkably following the Corinto plant changes in 1966. Corinto has been noted for its large white shrimp; this high-priced product is the fishery's mainstay. Other species, however, account for a large part of the production. During 1967, the fishing for white shrimp was very poor all along the coast from southern Mexico to El Salvador. The scarcity was reflected in Nicaragua, where a great increase in fishing effort could not maintain the catch at anywhere near the record 1966 level. (Regional Fisheries Attaché, U. S. Embassy, May 5, 1968.)

ASIA

Japan

1967 FISHERY CATCH SET RECORD

Preliminary data compiled by the Ministry of Agriculture and Forestry indicate the Japanese fishery catch in 1967 reached a record 7.7 million metric tons (excluding whales). This was 8 percent more than 1966's record 7.1 million tons. The high output was attributed to the abundant catch of Alaska pollock and ocean perch in the Bering Sea, and to the increased yield of seaweed. In the tuna fishery, indications were that total 1967 landings would be about the same as, or slightly below, 1966 landings. ("Suisan Keizai Shimbun," Apr. 15, 1968.)

	Landings	
	1967	1966
	(1,000 Metric Tons)	
Marine fisheries	7,110	6,560
Culture in shallow water	450	410
Inland water fisheries	100	100
Culture in inland waters	40	40
Total	7,700	7,110

* * *

CANNED FISH PRODUCT EXPORT TARGETS SET FOR FY 1968

On April 19, the government set export targets for fiscal year 1968 (April 1968-March 1969) of 23,946,000 cases worth US$195 million.

Canned Product	Fiscal Year 1968 Export Target		Fiscal Year 1967 Actual Exports	
	Quantity	Value	Quantity	Value
	No. Cases	US$ 1,000	No. Cases	US$ 1,000
Tuna	6,150,000	55,575	6,119,584	55,164
Salmon	1,125,000	37,125	1,636,929	54,624
Crab	401,000	9,845	458,748	11,979
Sardine	200,000	1,560	149,847	1,148
Saury	400,000	2,480	247,927	1,484
Mackerel	550,000	3,660	437,196	3,257
Other fish	7,310,000	41,640	6,887,520	39,198
Tangerines	4,650,000	28,788	4,948,827	30,983
Other fruits	400,000	2,355	506,051	2,998
Pet food	1,600,000	5,440	1,541,666	5,227
Others	1,160,000	6,259	1,112,362	5,445
Total	23,946,000	194,727	24,046,657	211,507

The export target is almost the same as the amount actually exported in FY 1967. That totaled 24,046,657 cases worth $211,507,000.

The canned salmon target was reduced 31 percent from last year's actual exports because of the uncertain pound sterling. ("Suisancho Nippo," Apr. 20, 1968.)

* * *

EXPORTS OF FISHING VESSELS ROSE IN 1967

Japanese exports of fishing vessels in 1967 totaled 175--68 more than in 1966--according to the Fisheries Agency.

Destination	Trawlers		Purse Seiners		Long-liners		Others		Total	
	'67	'66	'67	'66	'67	'66	'67	'66	'67	'66
South Korea	43	35	4	3	6	9	38	4	91	51
Philippines	19	0	2	2	3	1	3	2	27	5
Formosa	3	0			14	13			17	13
Hong Kong	11	0					1	0	12	0
Okinawa	0	4			6	12			6	16
Panama					3	2	2	0	5	2
Others	5	8			7	9	5	3	17	20
Total	81	47	6	5	39	46	49	9	175	107

South Korea and the Philippines were the leading purchasers of trawlers.

* * *

1968 NORTH PACIFIC WHALE CATCH QUOTA SET

The Japanese Fisheries Agency has announced a baleen whale catch quota of 1,001 blue-whale units (BWU) for the 3 fleets licensed for 1968 North Pacific whaling. The quota is the same as 1967's.

Name of Mothership	No. Catcher Vessels	Whale Catch Quota		Scheduled Departure Date
		Baleen	Sperm	
		BWUs		
"Kyokuyo Maru No. 2"	13	734		May 1, '68
"Tonan Maru"	3	267	1,000	May 13, '68
"Nisshin Maru No. 2"	8		2,000	May 12, '68

Also, a sperm whale quota of 3,000 whales was allocated. The catch limit for fin whales was reduced by 35 percent of the 1965 catch--to 951 whales. Therefore, the fleets will have to fish for sei whales to complete the remainder of the baleen whale quota. ("Minato Shimbun," Apr. 23; "Shin Suisan Shimbun Sokuho," Apr. 12, 1968.)

* * *

Japan (Contd.):

ANTARCTIC WHALING SEASON ENDS WELL

The 4 Japanese baleen Antarctic whaling fleets that participated in the 22nd (1967/68) Antarctic Whaling Expedition ended operations on March 20, 1968. All fleets attained assigned targets.

The International Whaling Commission had set an overall catch quota of 3,200 blue-whale units (BWUs). A national quota of 1,493 BWUs was allocated to Japan, 976 BWUs to the Soviet Union, and 731 BWUs to Norway. ("Minato Shimbun," Apr. 13, 1968.)

Production of the Japanese fleets was:

	"Nisshin Maru"	"Nisshin Maru #3"	"Tonan Maru #2"	"Kyokuyo Maru #3"	Total
	(No. of Whales)				
Whales:					
Fin.	320	44	249	-	613
Sei.	1,518	1,248	1,803	2,550	7,119
BWUs	413	230	425	425	1,493
	(Metric Ton)				
Product:					
Fin whale oil	8,521	4,163	8,110	8,010	28,804
Frozen products	24,080	13,609	25,639	25,232	88,560
Salted products	458	254	885	353	1,950
Meal	372	235	-	780	1,387
Solubles & others	1,620	1,298	26	-	2,944
Total	35,051	19,559	34,660	34,375	123,645
	(Percent)				
Recovery rate:					
Fin whale oil	20.63	18.11	19.08	18.85	
Frozen products	58.31	59.21	60.33	59.37	
Salted products	1.11	1.11	2.08	0.83	
Meal & others	4.82	6.78	0.06	1.84	
Total	84.87	85.21	81.55	80.89	

* * *

ALLOCATES IMPORT QUOTA FOR HERRING ROE ON KELP

The Japanese Government, which regulates import of herring roe on kelp, has adopted a new policy of allocating import quotas based on value rather than quantity. A quota value of about US$800,000 (160-170 metric tons) will be allocated to trading firms.

The system was adopted to prevent undue competition among these firms and to stabilize the market price.

First Imported in 1962

Herring roe on kelp, harvested only along the Alaskan coast, was first imported into Japan in 1962. Competition among about 30 trading firms forced up purchase prices. The result was that Alaskan pickers, first paid only about 6 cents a pound, received up to $1.20 a pound in 1967, a twentyfold increase. On the retail market, the price jumped from about US$3.16 a pound in 1963 to about $5.68 a pound in 1966. The Government hopes that importers will agree on setting a maximum import price of $2-2.10 a pound c.i.f.

Fierce trader competition not only pushed prices up but created disorder in the harvest areas. In 1962, about 150 Alaskans were collecting the egg-laden kelp; by 1967, the number had swollen to 1,800-2,000. The supply and demand for this unique product are limited by 2 factors: the harvest is tightly controlled by Alaska, and the market is confined to high-class restaurants in Japan and to Japanese-American consumers on U.S. mainland and Hawaii. ("Suisan Keizai Shimbun," Apr. 16, 1968.)

* * *

INCREASE SHRIMP FISHING IN CARIBBEAN

Several Japanese fishing companies are increasing their investments in Caribbean shrimp fishing. Of 40 shrimp trawlers ordered from U. S. boatyards in 1967 by Japanese companies, 5 were delivered and operated from Surinam, Dutch Guiana, in Nov. 1967.

By mid-Jan. 1968, 6 were fishing from Guyana (formerly British Guiana) and 29 more will be by fall. Crews of vessels fishing from Guyana will be Japanese, with one Guyanese aboard each vessel. Processing will be done by Guyana merchants, although processing vessels may be brought in from Japan when the fleet is up to full strength.

* * *

TO LONG LINE TUNA OFF PERU

The Taiyo Fishing Co. plans to conduct exploratory tuna long-lining off Peru this year with its newly built, 345-gross-ton, "Azuma Maru No. 31." The long-liner was scheduled to depart around the end of April 1968 on a one-year cruise.

One-half the expedition's cost, about US$178,000, will be subsidized by the Government under its $1.59-million fiscal year 1968 fishing-ground development program. ("Suisancho Nippo," Apr. 16, 1968, and other sources.)

* * *

Japan (Contd.):

SHRIMP FLEET OFF NORTHEAST SOUTH AMERICA

A fleet of 20 Japanese shrimp vessels is fishing off the coast of the Guianas, northeast South America. These 20 are part of the 35 vessels belonging to 7 fishing firms licensed in 1967 by the Japanese Fisheries Agency to explore for shrimp.

One firm, the South Pacific Fisheries Cooperative Association, has 3 U. S.-built double rigs in operation; 2 other vessels are scheduled to join the fleet shortly.

The shrimpers, based at Georgetown, Guyana, are fishing 20-30 miles off the the coast. The shrimp resource is believed to be stable.

Nichiro Fishing Co. has five 99-ton double rigs reportedly producing an average 300-400 pounds of headless shrimp per vessel per day. Also, Nichiro is operating a shrimp mothership fleet: the 1,000-ton-class mothership "Kuroshio Maru No. 22," six 260-ton shrimp trawlers, and one 90-ton double rig. This fleet originally was licensed to operate at the mouth of the Amazon River, but it is also permitted to fish off the Guianan coast off season.

Import Prices in Japan

Guianan shrimp is shipped to the U. S. and Japan. Import prices in Japan are generally similar to those paid for Mexican shrimp. Prices recently quoted on Japanese market were:

Count (Heads Off)	Wholesale Price Per 5-Lb. Block
	US$
Under 12	9.03
12 - 15	8.89
16 - 20	7.92
21 - 25	7.44
26 - 30	6.39

("Suisan Tsushin," Apr. 22, 1968, and other sources.)

* * *

LARGE STERN TRAWLER TO FISH GULF OF ALASKA

The 4,200-gross-ton, 4,400-hp. diesel, stern trawler "Kashiwada Maru," built at Usuki Shipyard, was scheduled to be launched in late May 1968. Completion of construction is set for late July.

When delivered to its owners, the trawler will be assigned to the Gulf of Alaska. There it will fish primarily for Pacific ocean perch, but it will also trawl for Alaska pollock and other bottomfish suitable for producing minced fish meat. ("Suisan Keizai Shimbun," Apr. 17, 1968.)

* * *

RESEARCH VESSEL TO WORK IN SOUTH PACIFIC

The Japanese Government-owned research vessel "Kaiyo Maru" (3,200 gross tons) was scheduled to depart May 15, 1968, on a 90-day research cruise to the South Pacific Ocean. The vessel will survey skipjack and other resources in the South Pacific off New Caledonia and New Zealand. ("Shin Suisan Shimbun Sokuho," Apr. 20, 1968.)

* * *

SUMMER ALBACORE FISHERY REPORTED SLOW

The summer albacore fishery off the Japanese home islands, which normally begins to pick up in early May, continued slow in late April. This was due to the delay in the warming of waters in all fishing grounds.

Catches of large albacore by bait boats off northern Bonin Island were unusually poor. Some vessels fishing off Aogashima, Shizuoka Prefecture, were taking around 6 metric tons of small albacore per day. Bait boats fishing for skipjack off Japan also were encountering poor fishing. ("Katsuo-maguro Tsushin," May 1, 1968.)

* * *

TRAWLER TO FISH OFF U. S. EAST COAST

The 1,500-gross-ton stern trawler "Akebono Maru No. 51," owned by Nichiro Fishing Co., was scheduled to depart Japan May 7

Japan (Contd.):

to explore off U. S. east coast. The vessel will proceed to the western Atlantic via the Panama Canal and survey the waters from New York to Florida for new trawling grounds.

Second Vessel Off Virginia

A second exploratory vessel, "Kiso Maru" (2,500 gross tons), belonging to Nihon Suisan, arrived off the U. S. east coast in early April. It was reported fishing off Virginia. Its catch to late April was about 200 tons of bottomfish, primarily butterfish, with squid and other species mixed in. ("Suisan Tsushin," May 1, 1968; other sources.)

* * *

LARGE TUNA SEINER TO FISH OFF WEST AFRICA

The newly built 499-gross-ton Japanese purse seiner "Gempuku Maru No. 82" departed Nagasaki on May 2 for the tuna grounds off West Africa. The vessel, owned by Toyo Gyogyo Fishing Co., will proceed to Abidjan, Ivory Coast, via the Panama Canal. It will join Nichiro Fishing Co.'s purse seine fleet now fishing in the Gulf of Guinea.

The Gempuku Maru

The Gempuku Maru is equipped with U. S.-type power block. It is one of the 2 largest one-boat seiners built in Japan; the other is the "Hakuryu Maru No. 55" (500 gross tons) built in 1967 for the West African purse-seine fishery. Its main specifications are: length, 157.8 feet; width, 32.1 feet; depth, 15.7 feet; main propulsion, 2,000-hp. deisel engine; refrigeration system--brine freezing with 60-ton daily freezing capacity and 300-ton storage capacity; maximum speed--14.5 knots; crew--25.

A Second New Seiner

On April 27, another new one-boat seiner, "Shofuku Maru" (100 gross tons), left Japan to join Nichiro's fleet off West Africa. This brings to 7 (4 two-boat and 3 one-boat units) the fishing units in Nichiro's purse-seine operation off West Africa. ("Minato Shimbun," Apr. 25, May 3; "Suisan Tsushin," May 1.)

日本

South Korea

FLEET OFF ALASKA

Despite technical problems off Japan, the Korean fishing fleet made it across the North Pacific in 11 days. On May 5, the master of the South Korean mothership "Sam Su No. 301" notified U. S. authorities that his fleet was off Rat Islands in the western Aleutians. He said it would operate in the Bering Sea "from May to August" 1968.

Less than 24 hours after arriving off Alaska, the South Koreans requested to enter U. S. territorial waters to make repairs. Request was granted to enter Nazan Bay (off Atka Island) from noon, May 7, through noon, May 9.

Engine Troubles

According to Japanese sources, the 7 fishing and support vessels of South Korea, which sailed from Pusan on April 24 for Bering Sea fishing, had been reported earlier lying off Urukawa (east of Cape Erimo in southwestern Hokkaido) due to engine troubles.

Malaysia

SHRIMP FISHING OFF SARAWAK RESUMED

After unsuccessful attempts in 1962-63, commercial shrimp trawling has been resumed off Sarawak by Tropical Seafoods (Sarawak) Co. This is a joint venture of the Japanese Tokyo Shrimp Co., Ltd., and a local businessman (Ong Kee Hui). The company operates 7 trawlers, each equipped with modern equipment--fish locators, quick-freezing plants, cold-storage holds, and desalination plants.

Largest Plant Built

Systematic studies of shrimp abundance were encouraging, so the company decided to build an up-to-date shore plant. It is the largest of its kind in Southeast Asia. It comprises 3 contact freezers for quick-freezing shrimp (capacity 1,800 lbs. every 3 hours); a semi-airblast freezer for deep-freezing fish (capacity 16,000 lbs. every 18 hours); a fish-meal plant (production 2 metric tons every 8

Malaysia (Contd.):

hours); and a cold storage (capacity 360 metric tons). The fish-meal plant also will produce 8,000 liters of fish oil per hour as a by-product.

Boost to Economy

The entire venture will give a much-needed stimulus to the local economy. It will help raise the per-capita income of Sarawak fishermen. It will enable Sarawak State to save considerable amounts of foreign currency--because her imports of fresh and frozen fish and fish meal will be greatly reduced, if not eliminated.

The plant is expected to be in full operation by 1970. Exports of frozen shrimp and fish are being considered for that date. (U. S. Consulate, Kuching, May 3, 1968.)

Pakistan

NEW FISHERY DEVELOPMENT PROJECTS APPROVED

Two new fishery-development projects were approved recently by the Executive Committee of Pakistan's National Economic Council. The projects are: sea exploratory

Small fish and prawns are carried in mat baskets onto beach 11 miles from Karachi, where they are sold. (FAO Photo)

fishing and oceanographic research in West Pakistan, and marine fisheries exploration and research in East Pakistan. (U. S. Embassy, Rawalpindi, May 13, 1968.)

SOUTH PACIFIC

Australia

APPROVES JAPANESE PART IN JOINT SHRIMP VENTURES

On April 25, the Australian Government licensed 7 Australian shrimp firms to fish for shrimp in the Gulf of Carpentaria off the Northern Territory. Three of the 7 involved joint ventures with Japanese interests. The Japanese firms are Taiyo Gyogyo, Kyokuyo Hogei, and Nampo Kaihatsu.

Foreign Vessels & Crews

Reportedly, the 3 joint ventures are permitted to employ foreign vessels and crews, provided they obtain prior approval from the Australian Government. They also are obligated to replace foreign nationals and vessels by Australian nationals and vessels within a prescribed period. ("Shin Suisan Shimbun Sokuho," May 1, 1968.)

1967 U. S. Trust Territory Fishery Developments

The major exporter of fish was the tuna cannery, a subsidiary of a California tuna canner, which started fishery operations in Palau in 1964. This company continued to train Micronesian fishermen. Other Micronesians were being trained in long-line fishing in Hawaii.

Permission was given to this company and to a second, a subsidiary of another California tuna canner, to conduct feasibility surveys in Truk for the purpose of expanding commercial fishing operations.

Exports Increase

Exports of fish by small private fishermen increased due to better freezing and storage facilities. Reef fish were marketed in the territory and in Guam by the Palau and Ponape Fishermen's Cooperatives.

Total revenue from the fishermen's exports during 1967 was US$93,510, not including commercial export. This was an increase of $15,408 over 1966. ("1967 Annual Report, Trust Territory of the Pacific Islands.")

AFRICA

Malagasy

SHRIMP FISHING INCREASES

Malagasy has granted provisional rights to a Lebanese firm to fish for shrimp off the northwest coast. At present, 5 Japanese-made vessels operated by SOMAPECHE (Société Malagasy de Pêcherie) and one U. S.-made vessel run by SIPAM (Société Industrielle de Pêche à Madagascar) are fishing there.

Using 2 French-made fishing vessels, the Lebanese firm will seek shrimp sources; if successful, it will form a joint-ownership company with the Government of the Malagasy Republic. (U. S. Embassy, Tananarive, Apr. 13, 1968.)

Dahomey

EXTENDS TERRITORIAL WATERS TO 12 MILES

On March 7, 1968, Dahomey's Council of Ministers extended the nation's territorial waters to 12 nautical miles from the low-water mark over which Dahomey claims exclusive rights to exploit minerals. (U. S. Embassy, Cotonou, Apr. 9, 1968.)

Gulf of Guinea

REPORT ON GUINEAN TRAWLING SURVEY

"Report on the Guinean Trawling Survey," a 3-volume trawling survey of the Gulf of Guinea from Cape Roxo, Senegal, to the Congo River, was published recently. It was the result of Joint Project 19 of the Scientific, Technical and Research Commission of the Organization of African Unity (STRC/OAU), Lagos, Nigeria, and the Agency for International Development (A.I.D.), Washington, D. C.

Survey's Purposes

Joint Project 19 investigated the fish potential of the West African Continental Shelf floor. Its purposes were to assess the composition of exploitable fish stocks, compare productivity in different fishing areas, and to locate areas most favorable to commercial trawling. The conclusion: "Provided that the local fishing fleets become more efficient, it is considered that both distant-water and local landings could develop in view of the enormous potential demand from the West African population for cheap animal protein."

To Purchase Report

The report, in English, is available at US$35 a set from the Publications Office, OAU/STRC, Publications Branch, B.P. 878, Niamey, Republic of Niger. The price includes surface shipment. Air shipment can be arranged at additional cost. The set is not available in separate volumes.

volume I	-	General Report, 828 pp.
volume II	-	Environmental Charts, 530 pp./240 charts
volume III	-	Data Report, 552 pp.

Nigeria

BUYS FISH FROM USSR

Nigerian firms continue to buy frozen fish from East European and Soviet fleets that fish close to Nigerian shores. No official data are available on the amount and value of these imports. The reason is that Nigeria does not technically consider these as imports--apparently because their "place of origin" is the sea, not a foreign port.

About 20,000 Tons

It is estimated, however, that Lagos firms purchased, in 1967, about 20,000 metric tons of frozen fish from Soviet, Polish, and Bulgarian fleets. (U. S. Embassy, Lagos, May 11, 1968.)

Soviet trade statistics show that the USSR exported to Nigeria 3,100 metric tons of fish in 1963, 9,700 in 1964, and none in 1965 and 1966. The data for 1965 and 1966 show only fish meal exports of 400 tons and 600 tons, respectively.

INDEX

Page

UNITED STATES:

1 . . World Cooperation Needed to Realize Ocean's Potential, BCF Director Says
6 . . 1967 New England Landings Show Ups and Downs
8 . . Contracts to be Awarded for Cleanup of Dead Alewives in L. Michigan
8 . . 1967 Great Lakes Production Is Greatest Since 1956
9 . . Catfish Farmers Form Trade Group
9 . . Blue Crab Deaths Increase in S. Carolina-Georgia Area
10 . . 1968 Import Quota for Tuna Canned in Brine
10 . . 2nd Boston Fish Expo Set for October
10 . . Gulf and Caribbean Fisheries Institute Annual Meeting

Oceanography:

11 . . 'Uses of the Seas' Is Theme of 'American Assembly'
13 . . Nautical Charts for Texas Intracoastal Waterway
14 . . 'Rainier' Is 14th Vessel in Coast & Geodetic Fleet
14 . . ESSA Vessel To Study Circulatory Current Patterns
14 . . Investigate 1-Mile-Deep Gash in North Pacific Floor
15 . . Book Answers 100 Questions About the Oceans
16 . . Foreign Fishing Off U. S. in April

States:

California:

20 . . First Basking Shark Liver Sent to Japan
20 . . EDA Helps Create Fishery Facilities at Crescent City

Alaska:

20 . . State Pollution Laws Strengthened
20 . . Salmon Cannery Plans to Reopen
20 . . Ferries to Serve Prime Fresh Seafoods
21 . . Kodiak Water Shortage Expected

Hawaii:

21 . . Seeks Air Link With Alaska

Florida:

21 . . Bans Sales of Certain Public Lands

Bureau of Commercial Fisheries Programs:

22 . . BCF's New Lobster Trap May Open Offshore Fishery

Search for Hake:

26 . . 1. The 'Baron' Finds Few Hake
28 . . 2. 'Cobb' Finds No Large Adult Hake Schools
31 . . 'Oregon' Dredges Calico Scallops Off Georgia and Florida
31 . . 'Oregon' Surveys Midwater Schoolfish Off East Coast
34 . . 'Gilbert' Compares Threadfin Shad With Nehu as Skipjack Bait
34 . . Fish Flown Round the World Remain Eminently Edible
34 . . New Shrimp Process Shown to Public
35 . . Larger Lobsters Are Active at Night, Study Shows
35 . . Some Alaskan Fish Semidormant Below 40° F.
35 . . Catfish Form Tight Schools in Colder Weather

ARTICLES:

36 . . The New Thread Herring Fishery in Eastern Gulf of Mexico, by Charles M. Fuss, Jr.

Page

ARTICLES (Contd.):

42 . . Recent Innovations for Trawl Net Reels, by William L. High
46 . . Safety for the Commercial Fishing Vessel and Crew, by John J. Murray

INTERNATIONAL:

53 . . Soviets and Poles to Buy Danish Propulsion Engines
53 . . Japan-USSR Northwest Pacific Talks End
54 . . Japanese Seek to Negotiate Mauritania's 12-Mile Limit
54 . . U. S. Joins Indian Ocean Fishery Commission
54 . . 1967/68 Antarctic Whale Catch
54 . . Canadian Conference on Fishing Vessel Construction Materials
55 . . Japan to Build Fish Harbor in East Pakistan
55 . . Norwegians and Danes Disagree Over Salmon Fishing

FOREIGN:

Canada:

56 . . Coho Salmon Investigations Underway
56 . . Government and Industry Sponsor Market Study
56 . . Summary of 1967 Marine-Oil Situation

Europe:

USSR:

57 . . To Build or Buy Stern Factory Trawlers Into 1970s
57 . . Promotes Fishermen Training on High Seas
58 . . Space Satellites Will Be Used to Aid Fishing and Study Oceans
58 . . Purse Seining Off U. S. Coast Begins
59 . . Party Paper Carries Criticism of Fisheries Ministry
59 . . King Crab Fishery in Eastern Bering Sea Ends
60 . . New Tuna Exploratory Vessel
60 . . New Fisheries Training Vessel Launched
60 . . Scientists Link Saury Migrations to Cyclone Activity
60 . . Research Vessel Visits Ivory Coast

United Kingdom:

61 . . Seeks to Export Fishery Techniques
61 . . Queen Scallops Shipped to U. S.
61 . . White Fish Authority Raises Interest on Loans
61 . . Fishermen Press New Foreign Landings Ban
62 . . Summary of 1967 Marine Oil Situation

France:

62 . . Plant to Produce Protein From Petroleum Products

Sweden:

63 . . To Build More Fish Carriers for USSR

Norway:

63 . . Fish Meal Production to be Lower in 1968
63 . . Exports in First-Quarter 1968 Reported
64 . . Firm Produces Low-Fat, High-Protein Fish Meal
64 . . Latest Equipment Used to Spur Fish Industry Growth

Denmark:

65 . . Holds Successful International Trade Fair
65 . . Greenland's Fisheries Are in Trouble
66 . . Salmon Caught Near Faroe Islands

Iceland:

66 . . Export Levies Raised on Fishery Products
66 . . Tries to Depend Less on Herring

Index continued page 80.

INDEX (CONTINUED)

Page

FOREIGN (Contd.):
Europe (Contd.):
Poland:
67 .. Trawler Collides With U. S. Tanker
Yugoslavia:
67 .. Documentary on "Fishermen of Tacoma" Planned
Latin America:
Peru:
68 .. Fish Meal Consortium to Begin Bulk Shipments
68 .. Report on Fish Meal Industry
Brazil:
69 .. Fishing Industry Protests Soviet Fishing Off Brazil
69 .. Pushes Development of Fisheries
Chile:
69 .. Soviets Aid Chile's Fisheries
70 .. Output and Export of Fish Meal & Oil, Whale Meal & Oil
Ecuador:
70 .. Seeks Financing to Modernize Fishing Industry
Argentina:
71 .. Soviet Fleet Leaves Argentine 200-Mile Zone
Honduras:
71 .. The Spiny Lobster Fishery
Nicaragua:
72 .. The Pacific Coast Fisheries
Asia:
Japan:
73 .. 1967 Fishery Catch Set Record
73 .. Canned Fish Product Export Targets Set for FY 1968
73 .. Exports of Fishing Vessels Rose in 1967
73 .. 1968 North Pacific Whale Catch Quota Set

Page

FOREIGN (Contd.):
Asia (Contd.):
Japan (Contd.):
74 .. Antarctic Whaling Season Ends Well
74 .. Allocates Import Quota for Herring Roe on Kelp
74 .. Increase Shrimp Fishing in Caribbean
74 .. To Long Line Tuna Off Peru
75 .. Shrimp Fleet Off Northeast South America
75 .. Large Stern Trawler to Fish Gulf of Alaska
75 .. Research Vessel to Work in South Pacific
75 .. Summer Albacore Fishery Reported Slow
75 .. Trawler to Fish Off U. S. East Coast
76 .. Large Tuna Seiner to Fish Off West Africa
South Korea:
76 .. Fleet Off Alaska
Malaysia:
76 .. Shrimp Fishing Off Sarawak Resumed
Pakistan:
77 .. New Fishery Development Projects Approved
South Pacific:
Australia:
77 .. Approves Japanese Part in Joint Shrimp Ventures
77 .. 1967 U. S. Trust Territory Fishery Developments
Africa:
Malagasy:
78 .. Shrimp Fishing Increases
Dahomey:
78 .. Extends Territorial Waters to 12 Miles
Gulf of Guinea:
78 .. Report on Guinean Trawling Survey
Nigeria:
78 .. Buys Fish From USSR

Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water. fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES

BCF Retail Workshops

The Bureau of Commercial Fisheries conducts seafood merchandising and quality control workshops for retail store personnel. The workshops include information on merchandising, quality control, product display, and suggested methods of seafood cookery. For further information, contact your nearest BCF Marketing Office.